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ANALYSIS OF THE GLOBAL TRANSPORTATION NETWORK'S POTENTIAL FOR EFFECTING STRATEGIC CHANGE IN MILITARY LOGISTICS

by

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The purpose of this thesis is to determine if the United States Transportation Command's (USTRANSCOM) Global Transportation Network (GTN) Prototype provides the quality of information and capability for Department of Defense (DoD) managers to effect strategic change in day-to-day logistics that will result in cost savings for the U.S. Military. The concept of "strategic change" with an information system is defined, and USTRANSCOM's objectives for the GTN and GTN Prototype are thoroughly reviewed. This research utilizes an extensive online examination of the current GTN Prototype to determine the quality of information available and its accessibility to users. This analysis concludes that the GTN Prototype provides the quality of information and capability for DoD managers to effect strategic change in the day-to-day logistics of transporting passengers and cargo moving overseas. However, the GTN Prototype is presently of limited value to users requiring transportation data on passengers and cargo moving within the continental United States.

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ABSTRACT

The purpose of this thesis is to determine if the United States Transportation Command's (USTRANSCOM) Global Transportation Network (GTN) Prototype provides the quality of information and capability for Department of Defense (DoD) managers to effect strategic change in day-to-day logistics that will result in cost savings for the U.S. Military. The concept of "strategic change" with an information system is defined, and USTRANSCOM's objectives for the GTN and GTN Prototype are thoroughly reviewed. This research utilizes an extensive online examination of the current GTN Prototype to determine the quality of information available and its accessibility to users. This analysis concludes that the GTN Prototype provides the quality of information and capability for DoD managers to effect strategic change in the day-to-day logistics of transporting passengers and cargo moving overseas. However, the GTN Prototype is presently of limited value to users requiring transportation data on passengers and cargo moving within the continental United States.

TABLE OF CONTENTS

I. INTRODUCTION

The United States Transportation Command (USTRANSCOM) is currently in the process of procuring a multi-million dollar transportation information system known as the Global Transportation Network (GTN). The procurement of the GTN is not motivated by a lack of information systems within the Defense Transportation System (DTS). Conversely, it is the very proliferation of transportation information systems, individually providing valuable service but unable to communicate and share data with each other, that has created the need for the GTN system.

The GTN is expected to collect, integrate, standardize, and make available the data from many of the transportation information systems currently in use. By doing so the GTN is expected to provide USTRANSCOM with the necessary Command and Control (C2) applications to centrally manage the DTS and provide their customers with the intransit visibility (ITV) capability to trace and track their passengers and cargo.

Currently the GTN is in the contract bidding stage of procurement with an award expected sometime in early 1995. Once the contract has been awarded the system is expected to reach initial operating capability in the fourth quarter of 1996. In the meantime, USTRANSCOM has fielded a prototype version of the GTN that relies on seven DoD transportation and logistics information systems to provide limited ITV capability over the DTS.

While USTRANSCOM is investing millions of dollars in the GTN, many professionals and academics have warned of the dubious payoff on investments in information systems. Many studies and analyses have concluded that large investments in information systems have often not shown a positive return on the investment.

However, more recent information systems studies are

beginning to show that investments will pay off if the information system is implemented and used properly. To earn a return on investment, information systems must be used to effect a strategic change, one that gives the organization a competitive advantage over its rivals. Often, to gain a strategic advantage a firm must reengineer or find new and innovative ways of conducting business.

The two fundamental issues examined in this thesis are: (1) USTRANSCOM's objectives for and implementation of the information system known as the GTN, and (2) the concept that an information system will provide the most benefit if it enables an organization to achieve a strategic change. The research intent is to determine if the GTN Prototype has the potential to provide the capability for DoD managers to effect a strategic change in day-to-day logistics that can lead to the U.S. military gaining a competitive advantage over its rivals.

Day-to-day logistics is the ordinary sustainment flow of passengers and cargo to non-deployed units and support organizations. This thesis is an examination from the point of view of the DTS customer who regularly asks the question, "Where are my incoming personnel and supplies and when will they arrive?" This same customer frequently regards the DTS as an information black hole, where it is not uncommon for items to disappear enroute or require an inordinate length of time to arrive. For many DTS customers, it is often easier to reorder than to attempt to trace their cargo through the myriad of channels in the DTS.

This chapter has introduced the GTN, the concept of strategic change with an information system, and has presented the research question for this thesis.

Chapter II defines and explores the idea of strategic change with an information system with some suggestions as to how changes in the DTS could potentially provide the DoD

with advantages over its rivals.

Chapter III explores the envisioned version of the GTN. It provides in more detail the background leading to the need for the GTN and USTRANSCOM's C2 and ITV objectives for the full version of the GTN currently undergoing contract bidding.

Chapter IV provides an indepth look at the current GTN Prototype. It explains in detail the information available in the Prototype and how it can be accessed.

Chapter V is an analysis of the GTN Prototype's potential for effecting strategic change in the day-to-day logistics business of the DoD. The concepts and criteria for strategic change discussed in Chapter II are applied to the information available from the GTN Prototype as illustrated in Chapter IV.

Finally, Chapter VI presents some conclusions and recommendations based on the analysis.

II. INFORMATION SYSTEMS

A. STRATEGIC CHANGE

An information system is used strategically when it allows an organization to develop competitive advantages over its rivals in meeting their objectives. It transcends the simple automating of day-to-day transactions to actually reengineering, or fundamentally changing, the work itself through the use of accurate, timely, and accessible information. Developing a competitive advantage is composed of two parts, having quality information and the management acumen to effectively exploit it.

An example illustrating the concept of using an information system strategically is Levi Strauss' recent announcement that through use of a computer system they will soon be offering made-to-order women's jeans at their stores. The system works by entering a woman's measurements in a computer at the Levi's store which then transmits the order to a factory where a robot cuts and assembles the fabric to the exact measurements. The order is then shipped back to the store or direct to the customer's home via Federal Express. Total time from order to receipt is approximately three weeks and the made-to-order jeans cost only about $10 more than off-the-rack jeans. This new system is expected to lead to competitive advantages in sales and service as well as benefits in the areas of inventory reduction and fewer in-store markdowns (Rifkin, p. 1, 1994).

Levi Strauss' management has gone beyond the traditional use of retail information systems in achieving inventory efficiencies and better stock positions to creating a whole new segment of business and a new way to sell their product. It was a combination of both the

information system and the management talent that led to development of Levi's new retail strategy. While it is too early to tell if the new made-to-order system will allow it to dominate the industry (they currently share the lead with Lee jeans) sales at the first test store are up a promising 300%.

B. COMPETITIVE ADVANTAGE

The achievement of competitive advantage is central to the whole concept of strategic change with information systems. When considering the term "competitive advantage" it may seem to relate only to private industry in areas such as customer service, productivity, or product innovation. Probably few would consider the Department of Defense (DoD) as having competitors in the same context as a business. However, the concept of competitive advantage is also applicable to the DoD, particularly in the area of logistics.

For the DoD, a competitive advantage can be anything that enables U.S. forces to accomplish their ultimate objectives of defeating an enemy on the field of battle or deterring a potential enemy from taking action. A logistics information system can enable U.S. forces to develop a competitive advantage in two areas: mobility and readiness.

In the past, when America has gone to war it has required a lengthy build-up and assembly of a weak, peacetime force to be transported to the theater of battle. For example, in World War II Germany declared war on the U.S. in December 1941, but not until 11 months later in November 1942 did the first U.S. ground forces land in Tunisia to oppose the Axis (McCullough, pp. 159, 242 1966).

Today however, the U.S. maintains a large, well-equipped military force expected to be ready and able to handle all but the most serious conflicts without a national

mobilization. While the need to transport that force to the theater of battle has not changed, there is no longer a lengthy period of time to arrange transportation while the force builds. Transportation must not only be available and ready, but also it must be used more effectively than ever before to provide U.S. forces the mobility they need to gain an advantage over the enemy.

Additionally, with the end of the cold war, the U.S. has closed or reduced many of its overseas bases. Reducing overseas military presence and the number of forces nearer a potential theater of operations increases the reliance of the DoD on effective and efficient mobility to move forces from the U.S.

With, a large, ready military force to be moved, and a smaller overseas presence to move from, mobility has become more vital than ever as a competitive weapon of U.S. forces in defeating or deterring enemies. An information system that streamlines logistics and provides U.S. forces with an improved capability to get the right stuff to the right place at the right time will greatly enhance this advantage and could make the difference between winning and losing in future conflicts.

The second area a logistics information system can help enable U.S. forces to develop a competitive advantage is in readiness. As a result of the end of the cold war, military budgets have steadily decreased, a trend that is expected to continue or at best stabilize. Yet, U.S. forces are committed around the world at an operating tempo nearly as great as that experienced during the cold war. With considerably less money to maintain a comparable degree of operating tempo, the DoD either has to sacrifice readiness or find a more efficient and effective way of conducting business. A logistics information system enabling the Defense Transportation System (DTS) and supply system to

become more efficient and effective could yield tremendous savings that could be made available for maintaining the readiness of operating forces. Essentially, every dollar saved in logistics is another dollar available for operating forces.

C. EFFECTIVE USE OF INFORMATION SYSTEMS

While there is a relative abundance of computers and information technology available and employed, it is evident that in many organizations information systems are not being used effectively, efficiently or economically (O'brien, 1994, p. 412). American business invested over one trillion dollars in information systems during the 1980's, yet economists have been unable to associate computer investment with increased corporate profits (Shaw, 1994, p. 12), a situation widely known as the "productivity paradox". Simply investing in computers for the purpose of modernizing the organization or automating transactions is not enough. There has to be a clear understanding of the expected changes and benefits of the system.

> Pour information systems into an organization without first considering how work flows will change, what management layers to drop, or what new abilities to exploit, and the result will be an unproductive automation of obsolete processes. (Shaw, 1994, p. 13)

Recent studies are beginning to show that investments in information technology are paying off. The payoff is coming from changes in the organization and management that are resulting in finding new, more effective ways of accomplishing work and developing innovative competitive advantages like Levi Strauss. It is a process that questions the way work has been done and starts over. (Gleckman et al, 1993, p. 57)

The sole purpose of introducing any new system is to improve some aspect of the organization. It is to deliver a benefit that may lead to, or is itself, a competitive advantage. What the system is expected to do, how, when, and who is responsible, are key considerations that need to be properly addressed during the planning stage.

During implementation, the information system needs to be regularly measured against the objectives stated during the planning stage to ensure that the purposes for which it is intended will be realized. Some of the more frequently cited objectives of information systems include:

- Improved productivity
- Reductions in the cost of failure
- Reduced information systems costs
- Reduced overhead costs
- Improved response times
- Improved resource utilization
- Increased customer confidence
- Increased staff confidence
- Improved decision making
- Improved management productivity

(Remenyi, pp. 54 - 63, 1991)

One of the reasons frequently cited for why information technology benefits are not realized is that the computer department frequently turns over the project, ending their commitment, to end-users either too busy or not involved enough to make the system work as envisioned (Remenyi, p. 33, 1991). While much of the literature on information systems is replete with discussions and examples of what not to do, there are few specific guidelines for success. The one distinguishing theme common to all the literature examined is that successful implementation requires the continuing commitment and cooperation of management, the information systems department, and end-users.

D. SUMMARY

To use an information system strategically requires the development of competitive advantages in meeting an organizations objectives. This requires not only good information, but the managerial talent to exploit it. The DoD can use a logistics information system to develop competitive advantages in both mobility and readiness. However, effective use of an information system is challenging, and many organizations have been unable to make their investment in computers payoff. To effectively implement an information system requires the commitment of management, the information systems department, and end-users in a process with clearly stated objectives and a program to continually monitor, and if necessary adjust, the information system.

III. THE GLOBAL TRANSPORTATION NETWORK: THE VISION

A. BACKGROUND

Prior to the Goldwater-Nichols DOD Reorganization Act of 1986, responsibility for management of Defense transportation was entrusted to the three services. The Army primarily managed ground transportation, the Navy, strategic sealift and the Air Force, strategic airlift. The result of each service managing a segment of the DTS was the development of three individual Transportation Component Commands (TCCs). The Army created the Military Traffic Management Command (MTMC), the Navy the Military Sealift Command (MSC) and the Air Force the Air Mobility Command (AMC) (formerly the Military Airlift Command). The TCCs, operating independently from each other, developed redundant capabilities and conflicting policies and procedures reflecting the needs and priorities of their respective service. (USTRANSCOM DTS 2010 ACTION PLAN, p. 1-1, February, 1994)

While each of the services may have been trying to optimize their own segment of the DTS, the system as a whole suffered. Transportation users were confronted with conflicting policies and procedures and had to work with many different sources to coordinate movement. Additionally, various exercises highlighted severe coordination and communication problems among the services in effectively moving passengers and cargo.

User problems and frustrations as well as serious system inefficiencies prompted the 1986 Blue Ribbon Commission on Defense Management to recommend a single unified transportation command to integrate global land, sea, and air transportation. With the passing of the Goldwater-Nichols DOD Reorganization Act the United States Transportation Command was established and formally

activated on 1 October 1987. (USTRANSCOM DTS 2010 ACTION PLAN, p. 1-1, February, 1994)

Initially, the services retained their respective single manager charters, severely restricting the newly formed USTRANSCOM's ability to exercise control and centrally manage the DTS. The logistics problems of Operation Desert Shield/Storm accentuated the inefficiency of this fragmented approach to defense transportation management and prompted a much needed change. (USTRANSCOM DTS 2010 ACTION PLAN, p. 1-1, February, 1994)

On 14 February 1992 the Secretary of Defense established the United States Commander in Chief Transportation Command (USCINCTRANSCOM) as the single manager of the DTS. This act permanently assigned the services TCCs, MTMC, MSC, and AMC; to USTRANSCOM in time of peace and war. (USTRANSCOM DTS 2010 ACTION PLAN, p. 1-2, February, 1994) USTRANSCOM's new mission is to provide global land, sea, and air transportation to the DoD in peacetime and war. (GTN SYSTEM SPECIFICATION, p. 1, May 9, 1994) Their mission is larger and more complex than any commercial shipper and they move a volume of cargo even greater than industry giants General Motors and General Electric. (Bonney, p. 54, May 1994)

With its new mission, USTRANSCOM inherited an immense, fragmented, inefficient transportation system which they assessed as having several critical, ingrained problems:

- DTS suppliers and customers must frequently arrange and interact with multiple organizations to coordinate transportation;
- Visibility of local DTS operations is poor;
- A "best value" approach to procuring transportation is not fully utilized;
- The DTS has many different systems for financial management and billing;

- Customers at all levels are frustrated by a lack of movement visibility;
- The DTS command and control (C2) systems are uncoordinated and non-integrated;
- There are numerous automated systems supporting the DTS; and
- Management and operation of the strategic seaports is fragmented and uncoordinated.

(USTRANSCOM DTS 2010 ACTION PLAN, pp. 1-2, 1-3, February, 1994)

USTRANSCOM views these problems to be at the very foundation of the current DTS. To remedy them will require fundamental changes that cannot be accomplished through incremental improvements to the current transportation system. USTRANSCOM believes nothing less than a complete reenginering of the DTS will enable them to effectively and efficiently perform their mission. To accomplish the reenginering, USTRANSCOM has developed seven end state objectives (ESOs) for the future of the Defense Transportation System:

- Empowered DTS Agents to service the point of origin;
- A Joint Mobility Control Group that integrates common-user "traffic management" to include both organic and commercial lift;
- A seamless hand-off of information, passengers and cargo at the theater port of debarkation/staging area to the theater commander;
- A global information system that integrates traffic management processes and databases in peace and war;
- A single, integrated procurement system for USTRANSCOM; and
- A joint transportation technology focal point for

transportation engineering and the development/application of transportation-related technologies.

(USTRANSCOM DTS 2010 ACTION PLAN, p. 1-5, February, 1994)

The achievement of the end state objectives are not only necessary to remedy fundamental DTS problems, but are also crucial to achieving USTRANSCOM's strategy and vision of the future. Their vision of the future embraces the philosophy of maximizing support to the customer by providing responsive, efficient, and cost-effective intermodal transportation. (USTRANSCOM DTS 2010 ACTION PLAN, p. 1-5, February, 1994)

B. INFORMATION PROBLEMS

A result of the services' independent management of the TCCs was a proliferation of automated transportation systems. The Joint Transportation Corporate Information Management Center (JTCC) has identified over 150 separate automated systems supporting DTS functions. These systems are not coordinated or capable of sharing data. This lack of systems integration results in unnecessary redundancy and the frequent need for transportation suppliers and users to work with more than one system to coordinate passenger and cargo movement. For example, the Army's Fort Stewart Installation Transportation Office (ITO) uses eight different automated systems. One for personal property, three for passenger service, and four for various cargo and unit movements. (USTRANSCOM DTS 2010 ACTION PLAN, pp. 1-3, 2-3, February, 1994)

USTRANSCOM has concluded the effect of all these independent, fragmented systems is unnecessary overhead and a high level of customer frustration resulting in workarounds to circumvent existing policies. (USTRANSCOM

DTS 2010 ACTION PLAN, p. 2-5, February, 1994).

While the problems associated with so many automated transportation systems may be a major source of frustration and inefficiency during peacetime operations and exercises, they become critical deficiencies and weaknesses during crisis and war. During the recent Gulf War, the problems associated with numerous non-integrated information systems manifested themselves in a number of ways:

- More than 20,000 of the 40,000 containers shipped to the theater of operation had to be opened, inventoried, resealed, and reinserted into the transportation system because information on their contents was not available;
- Approximately 60% of evacuated patients ended up in the wrong destination; and
- Timely movement and status information needed to divert and reconstitute deploying unit and non-unit shipments was not available. (Draft Executive Summary: Defense Intransit Visibility Integration Plan, p. iii, 5 August 1994)

Furthermore, the Naval Supply Systems Command found that the multiple uncoordinated sources of surface movement information during Operation Desert Shield/Storm resulted in time consuming efforts to aggregate data. This often led to a lack of logistics information being available when it was needed the most. (Naval Supply Systems Command, p. I-20, April 1992)

In addition to the serious information problems that emerged from the Gulf War, USTRANSCOM has identified further information deficiencies interfering with the attainment of four of their critical mission objectives:

- **Strategic mobility planning.** Currently USTRANSCOM relies on the cumbersome Joint Operation Planning and Execution System (JOPES) for mobilization,

deployment, sustainment, and redeployment of forces and material. JOPES is time consuming and not based upon real-world movement requirements. USTRANSCOM requires a faster, more capable system for transportation analysis based on actual movement data.

- **Policies and procedures for consistency and a smooth transition from peace to war.** To meet this objective, USTRANSCOM requires comprehensive information on the status and readiness of transportation assets. Without this information, USTRANSCOM is unable to coordinate the various elements of the DTS in a timely and effective manner.
- **Effective and efficient management of DoD transportation resources.** The management of scarce transportation resources without centralized planning and coordination results in inefficiencies and consequently less lift. USTRANSCOM does not have adequate access to transportation information to improve resource utilization.
- **Integration of DoD transportation-related command, control, communication, and computer system capabilities (C4S).** In the past, each TCC developed information systems to meet their own needs, thus limiting the interoperability and data sharing among the services. USTRANSCOM must integrate and standardize the different, incompatible TCC information systems to achieve its mission as a single manager for common-user transportation assets. (MISSION NEED STATEMENT FOR GLOBAL TRANSPORTATION NETWORK, pp. 1-2, 1 April 1993)

For USTRANSCOM the requirement for a comprehensive transportation information system is clear. It is needed to correct fundamental DTS problems and to realize their vision of the future through achievement of their end state objective for a global information system. It is needed to remedy the logistics information problems that emerged from the Gulf War and ensure the same problems do not recur in future conflicts. And finally, a new, more capable transportation information system is necessary to fully accomplish four of USTRANSCOM's critical mission objectives.

C. THE GLOBAL TRANSPORTATION NETWORK

1. Overview and Source Systems

The Global Transportation Network is the system being developed to redress many of USTRANSCOM's information shortcomings and improve service to the customer. USTRANSCOM defines the GTN as:

> ...an automated command and control information system that supports the family of transportation users and providers (both DoD and commercial) by providing an integrated system of intransit visibility information and command and control capabilities. (GTN SYSTEMS SPECIFICATION, p. 1, May 9, 1994)

There are two separate, distinct applications of the GTN: Command and Control (C2) and intransit visibility (ITV).

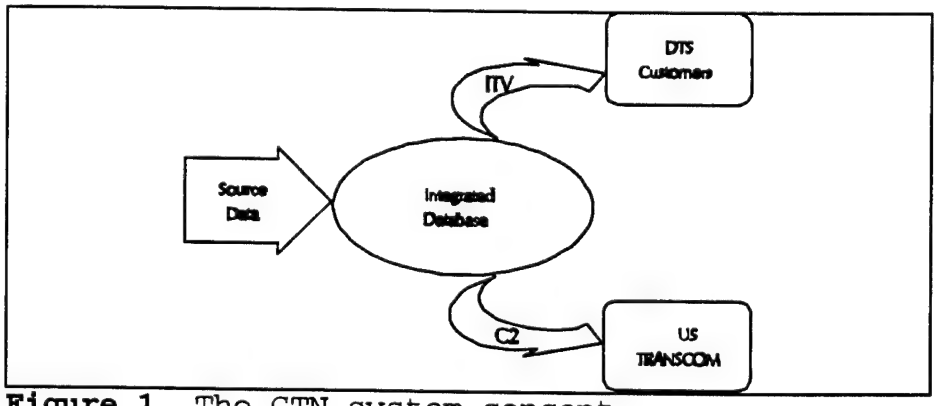


Figure 1 The GTN system concept

Command and Control is primarily for use by USTRANSCOM, while ITV is being developed for users.

The GTN will receive transportation data on a recurring basis from existing USTRANSCOM, TCC's, and commercial source systems. Currently, these source systems individually provide valuable service, but collectively fail to provide USTRANSCOM the information necessary to centrally manage the entire DoD transportation network. (GTN OPERATIONAL REQUIREMENTS DOCUMENT, p. 4, 1 April 1993) Additionally, these source systems fail to provide DTS customers with adequate visibility over their shipments, a situation becoming more acute as intermodal transportation use continues to grow.

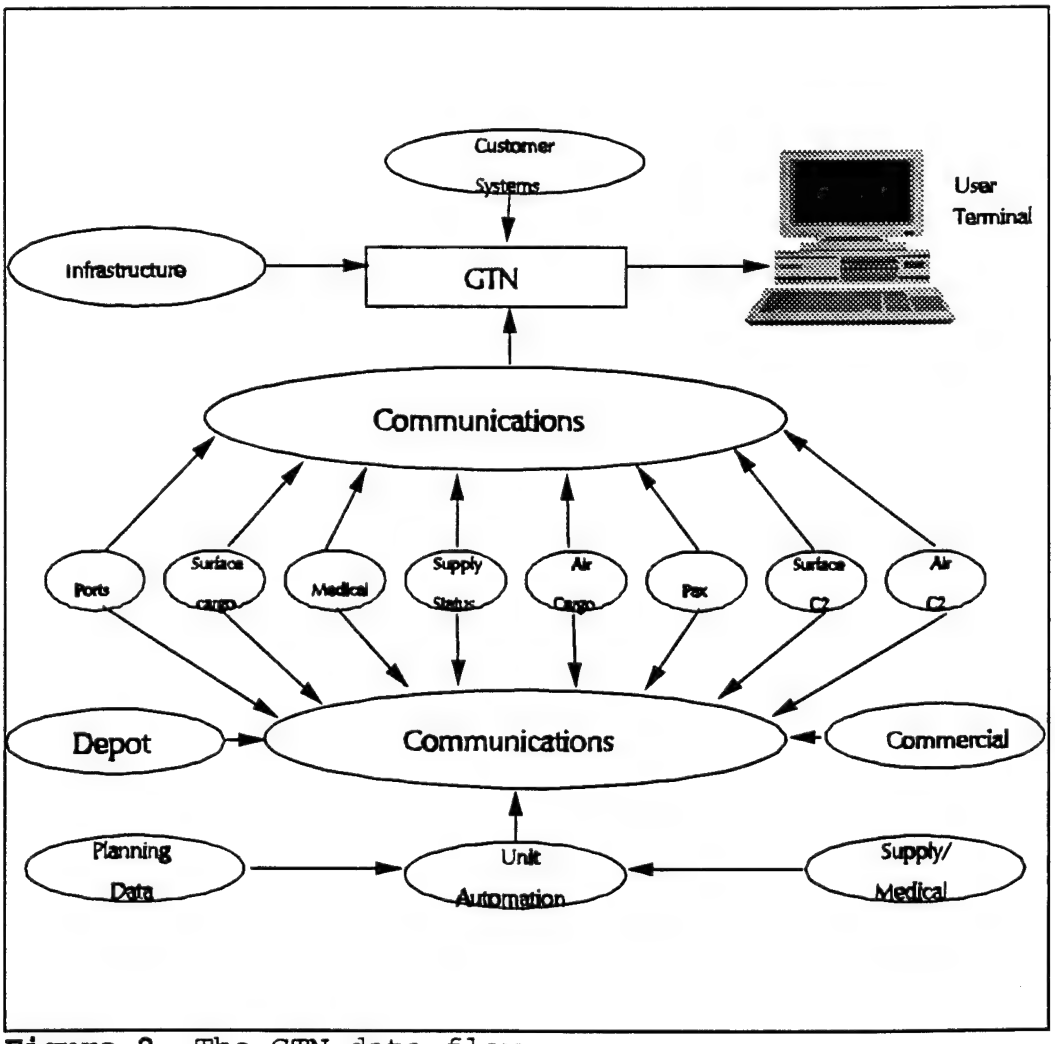


Figure 2 The GTN data flow

The GTN will bridge USTRANSCOM's information gap by collecting, standardizing, and integrating the data from these source systems to develop the Transportation Corporate Database (TCDB) for use by USTRANSCOM and customers of the DTS.

Presently, there are nineteen source systems planned to provide information to the GTN. These include:

- **Defense Automated Addressing System** (DAAS). DAAS will provide the GTN information on the status of supply requisitions and shipments ordered from defense depots.
- **Defense Transportation Tracking System** (DTTS). DTTS will provide tracking data on truck shipments of class I explosives.
- **Global Decision Support System** (GDSS). GDSS will provide the GTN with information on all Air Mobility Command actual and scheduled flight arrivals and departures, itineraries, and manifests for all carriers, tankers, and aero-medical evacuation flights.
- **Headquarters On-line System for Transportation** (HOST). HOST will provide information on air cargo manifested, lifted, intransit, and onhand at AMC aerial ports.
- **Aerial Port Documentation and Management System** (ADAM III). ADAM III will provide the same information as HOST in the event HOST is not available.
- **Passenger Reservation And Manifesting System** (PRAMS). PRAMS will provide data on passenger manifests and itineraries for passengers booked on AMC flights.
- **Integrated Command, Control, and Communications System** (IC3). IC3 will provide the GTN with

information on MSC ship schedules, movements, characteristics, and port characteristics.

- **Mechanized Export Traffic System** (METS II). METS II will provide the GTN with data on cargo booked for ocean shipment on MSC vessels and on schedules of commercial ships moving military cargo.
- **Terminal Management System** (TERMS). TERMS will provide the GTN detailed data on military cargo arriving, departing, and onhand at continental U.S. (CONUS) water ports.
- **Department of Army Standard Port System - Enhanced** (DASPS-E). DASPS-E will provide the GTN with detailed data on military cargo arriving, departing, and onhand at outside CONUS (OCONUS) water ports.
- **Worldwide Port System** (WPS). WPS is a new system currently being implemented. It is replacing TERMS and DASPS-E and will provide the same information to GTN as these systems.
- **CONUS Freight Management System** (CFM). CFM will interface with the GTN to provide commercial land carrier military cargo bookings, schedules, and movements.
- **Joint Operations Planning and Execution System** (JOPES). JOPES, a C2 system, will receive information from the GTN. The GTN will update JOPES on the status and movement of forces and sustainment as required by a specific operational plan (OPLAN).
- **Standard Theater Army Command and Control System** (STACCS). STACCS will provide data to the GTN on forces departing the European Command (EUCOM) theater and receive data from the GTN on unit and non-unit departures, schedules, bookings and

manifests.

- **Department of Army Movements Management System-Redesign** (DAMMS-R). DAMMS-R will interface with the GTN to provide information on the status of units and material departing from a theater of operations. The GTN will provide DAMMS-R data on carriers, schedules, departures and passenger and cargo manifests.
- **Air Terminal Command and Control System** (ATCC). The GTN will provide the ATCC with data on AMC cargo aircraft departures and schedules.
- **United States Strategic Command** (USSTRATCOM). The GTN will provide USSTRATCOM with information on the location, schedules, and readiness of aerial tanker assets.
- **Transportation Coordinator's Information for Movements System** (TCAIMS). Each service is developing its own TCAIMS. When complete, the TCAIMS will interface with the GTN to provide ITV on commercial domestic and international air express shipments.
- **Global Command and Control System** (GCCS). GCCS is still under development. When complete the GTN will provide the necessary C2 and ITV data to support its transportation information needs.

(GTN SYSTEM SPECIFICATION, pp. 95-105, May 9, 1994)

2. Applications

a. Command and Control

Command and Control, one of the two major applications of the GTN, enables a commander to plan, direct, and control forces and operations to complete an assigned mission. USTRANSCOM's major C2 system objectives are to provide policies and procedures, data, and

applications to transition from peacetime to wartime. (GTN OPERATIONAL REQUIREMENTS DOCUMENT, p. 3, 1 April 1993)

The C2 capability of the GTN will provide USTRANSCOM with real-time information on the status and readiness of the DTS including availability of assets, on-hand workload, and backlog of cargo at all ports. Additionally, the GTN will provide C2 capabilities in the area of transportation analysis and feasibility studies.

The GTN will support early identification of movement requirements through its automated collection and maintenance of transportation information. The early identification of movement requirements is expected to provide USTRANSCOM with the following capabilities:

- Receive, evaluate, and process requirements for movement;
- Support determination of mode and transportation resources required to support movement requirements;
- Allocate requested transportation assets;
- Support determination, validation, and monitoring of transportation channels based on movement requirements and forecasts; and
- Provide daily cumulative requirement flows over any leg or port in the deployment scheme and any transportation schedule.

(GTN SYSTEM SPECIFICATION, p. 34, May 9, 1994)

The GTN will provide the capability to forecast total DoD movement requirements for specified periods of time based on analysis of historical data, current conditions, and user input. (GTN SYSTEM SPECIFICATION, p. 38, May 9, 1994)

Additionally, GTN will be required to have the capability to do feasibility studies. USTRANSCOM will be able to use the GTN to assess the feasibility of operating

plans proposed by the Commanders in Chief (CINCs). The GTN should be able to rapidly answer questions such as:

- How long will it take to move a force to a specified location with a specified amount of lift?
- How much lift will be required to move a force to a specified location by a specified date?
- How much will it cost to move a force to a specified location using different transportation modes?

(GTN SYSTEM SPECIFICATION, pp. 37, 41, May 9, 1994)

The GTN C2 capabilities will give USTRANSCOM the information to centrally manage the DTS, plan for future requirements, and effectively transition from peacetime to wartime. General Fogleman, former Commander in Chief of USTRANSCOM, fully expects the GTN to be the C2 system that leads USTRANSCOM into the 21st century. (Fogleman, p.10, August 1994)

b. Intransit Visibility

The second major application of the GTN, intransit visibility, is the ability to track and identify DoD unit and non-unit cargo, passengers, medical patients, and personal property from origin to destination. (Draft Executive Summary: Defense Intransit Visibility Integration Plan, p. iii, 8 Aug. 1994)

The ITV application is primarily designed to support USTRANSCOM's customers. Users of the GTN should be able to identify the contents of a shipment and monitor its location as it moves through the transportation system. The GTN will provide the capability to track unit and non-unit cargo by Transportation Control Number(TCN), Unit Identification Code (UIC), Unit Line Number (ULN), requisition number and national stock number (NSN). Additionally, cargo manifests loaded into source systems

should be available to GTN users. In addition to ITV over cargo moving through the military transportation network, the GTN is expected to contain information from commercial systems resulting from DoD purchase orders. The Defense Logistics Agency (DLA) has already begun to move towards developing ITV over small-parcel commercial air shipments. Recently, DLA announced that to achieve their objectives of intransit visibility and electronic data interchange (EDI) they would be limiting the number of carriers they ship air cargo with to only one or two. (Page, p. 39, July 25 1994) It is expected that the carriers DLA selects will eventually interface their information systems with the GTN.

Through a query and response interface, users will have near real-time information to track individual requisitions, commodities, and unit movements. This capability will represent a dramatic improvement for some DTS customers. For example, customers of the Army's DASPS-E system have had to wait up to a week to get an answer on a surface shipment trace as DASPS-E operators had to load and process history tapes to search for the requested item. (Libby, p. 3, March 1994)

Two key interrelated cargo logistics problems the ITV application of the GTN is expected to improve are customer over-ordering and long delivery times. Slow delivery cycles, without adequate visibility of the order, causes customers to overorder, clogging the distribution channel and further slowing the process. USTRANSCOM hopes that with the GTN's overview capability and the ability to more closely monitor the DTS they will be able to reduce the time between requisition and delivery. Improving delivery times and providing their customers with ITV over their shipments, so they can confirm their orders are intransit, should greatly reduce customer overordering and thereby further improve delivery times. (Bonney, pp. 55-56, May

1994)

In addition to ITV over cargo, the DoD needs the capability to track the location, movement, and schedules of personnel to ensure that field units and Navy ships are brought up to strength during crisis and war. (Draft Executive Summary: Defense Intransit Visibility Integration Plan, p. xii, 5 August 1994)

The GTN will provide the capability to track personnel by Unit Identification Code (UIC), Unit Line Number (ULN), ship name, aircraft mission number, Military Operational Specialty (MOS), social security number (SSN), and name. (GTN SYSTEM SPECIFICATION, p. 27, May 9, 1994) This will provide theater or unit commanders critically short on personnel with a specific specialty (MOS) to determine how many people with the MOS they need are incoming to their theater or unit. Furthermore, it will provide Navy ships with the capability to effectively route personnel to their next port-of-call in the event of a change in their ship's schedule.

The GTN will also provide the capability to track medical patients and their movement and treatment requirements by name and SSN. Additionally, it will provide information on the location and status of medical crews, non-crew attendants, essential aeromedical equipment, and supplies, thereby allowing for the more effective management of medical evacuations. (GTN SYSTEM SPECIFICATION, p. 28, May 9, 1994)

Finally, the GTN will provide visibility over aircraft refuelling assets by mission number, receiver aircraft type, tanker type, rendezvous location and time.

In summary, the ITV application of the GTN will provide DTS suppliers and users with intransit visibility over cargo, equipment, sustainment supplies, personnel, medical evacuations, and air refueling assets. This is

expected to provide significantly enhanced capabilities for them to effectively manage the movement of their supplies and people as well as provide more efficient use of relatively scarce medical and air refueling assets. The ITV function is considered so important that General Fogleman declared 1994 as the "year of intransit visibility" for USTRANSCOM. (Walz, p. 3, March/April 1994)

3. Users

USTRANSCOM anticipates having approximately 5,000 users whose access to GTN capabilities will be based on need. The types and needs of users have been categorized into three groups:

- Primary group: Crisis Action Team (CAT) in the command center of USTRANSCOM. Approximately 100 users who will need the GTN's C2 information during crisis or war.
- Second group: operation and planning staff officers outside the CAT. Approximately 400 users who will need both the C2 and ITV capabilities of the GTN.
- Third group: logistics support personnel. Approximately 4500 who will need location and shipment status information provided by the GTN's ITV application.

(OPERATIONAL REQUIREMENTS DOCUMENT, p. 26, 1 April 1993)

GTN users will be able to connect to the system in several different ways:

- Local area network (LAN): primarily the LAN at Scott AFB, Illinois where the GTN will be located.
- Wide area network (WAN): including the Military Network (MILNET) and the Defense Information Systems Network (DISN).
- Satellite: over the International Maritime

Satellite (INMARSAT).

- Remote user dial-in: with a modem and a terminal over the Defense Switched Network (DSN).
- Remote user dial-in: with a modem and a terminal over commercial phone lines.

(GTN SYSTEM SPECIFICATION, pp. 78-79, May 9, 1994)

The GTN will be developed from the user perspective and should be intuitive with users being able to effectively use the system with minimal training. Training and assistance will however be available from several sources:

- **Computer Based Instruction** (CBI). The GTN will have an online training module that will allow users to become familiar with the system without using actual GTN databases.
- **Help**. An online help capability will be provided on the GTN.
- **Hot line**. Expert GTN assistance will be available over the telephone to users 24 hours a day.
- **User's manual**. A GTN users manual will be provided online and can be printed as required.
- **Functional training**. Formal classroom training will be provided for approximately 500 functional users at USTRANSCOM.

(GTN OPERATIONAL REQUIREMENTS DOCUMENT, p. 15, 1 April 1993)

GTN users will also have communications capability with the system. Users will be able to send electronic mail (e-mail) to any other user with an account on the system. With ITV, this communications capability will allow customers to send redirection or expedited shipment messages to transition points along their shipments route. Additionally, users will have the ability to send trouble and comment reports, and receive replies, over the GTN to the system operator. (GTN SYSTEM SPECIFICATION, p. 48, May

9, 1994)

D. SUMMARY AND STATUS

The redundancies and inefficiencies of the Defense Transportation Systems past history are nowhere more evident than in the proliferation of over 150 non-integrated transportation information systems. USTRANSCOM recognizes that if they are ever going to centrally manage the immense DTS and attempt to optimize the system they need to aggregate and access the movement information currently being produced. Rather than attempt to replace the systems in existence, USTRANSCOM is collecting, integrating, standardizing, and making available the data from the best systems currently in use. In doing so they will be providing themselves with the command and control information they need to centrally manage the DTS, smoothly transition from peacetime to war, and improve service to their customers by providing them with intransit visibility over their shipments and personnel.

In March 1993, USTRANSCOM fielded a prototype version of the GTN. It began with visibility of AMC cargo and passenger movements and has expanded to include limited visibility of surface shipments.

Currently, USTRANSCOM is in negotiation for the complete version of the GTN with a contract expected to be awarded in early 1995 and initial operating capability (IOC) achieved in late 1997. (Draft Executive Summary: Defense Intransit Visibility Integration Plan, p. v., 5 Aug 1994)

IV. THE GLOBAL TRANSPORTATION NETWORK: PROTOTYPE

A. INTRODUCTION

The GTN Prototype located at Scott AFB, Illinois is an unclassified transportation information system that provides visibility over cargo and passengers at a level of detail previously unknown in the Defense Transportation System. The Prototype provides its more than 1600 users with integrated transportation information to assist them in making better logistics decisons and in tracking their cargo and passengers. Additionally, the prototype focuses on providing information to centrally manage the DTS and is being used daily by USTRANSCOM to support the Command's mission of providing transportation to the DoD. (GTN USERS' COURSE, pp. 1-2 - 1-9, 30 SEPTEMBER 1994)

B. PROTOTYPE OVERVIEW

The Prototype concept, as illustrated in Figure 3, collects, integrates, standardizes, and makes available data from seven currently operating transportation information systems. These source systems are:

- **Defense Automated Addressing System** (DAAS): DAAS updates the GTN Prototype with requisistion status information every fifteen minutes.
- **Passenger Reservation and Manifesting System** (PRAMS): PRAMS updates the GTN Prototype with AMC passenger data every four hours.
- **Aerial Port Documentation and Management System III** (ADAM III): ADAM III continuosly updates the GTN Prototype with AMC air cargo information.
- **Mechanized Export Traffic System II** (METS II): METS II continually updates the GTN Prototype with MTMC ocean cargo and ship schedule information.
- **Terminal Management System** (TERMS): TERMS updates

the GTN Prototype with MTMC ocean cargo data continuosly.

- **Worldwide Port System** (WPS): WPS continually updates the GTN Prototype with both CONUS and OCONUS military waterport cargo information.
- **Global Decision Support System** (GDSS): GDSS updates the GTN Prototype with AMC aircraft schedules and status every thirty minutes.

(GTN USERS' COURSE, pp. 1-4, 1-5, 30 September 1994)

To gain access to the Prototype system requires a written request on command letterhead mailed or faxed to the USTRANSCOM GTN PMO (Program Management Office). The request must include basic information such as name, rank, and phone number as well as security clearance and a statement of how the system is intended to be used.

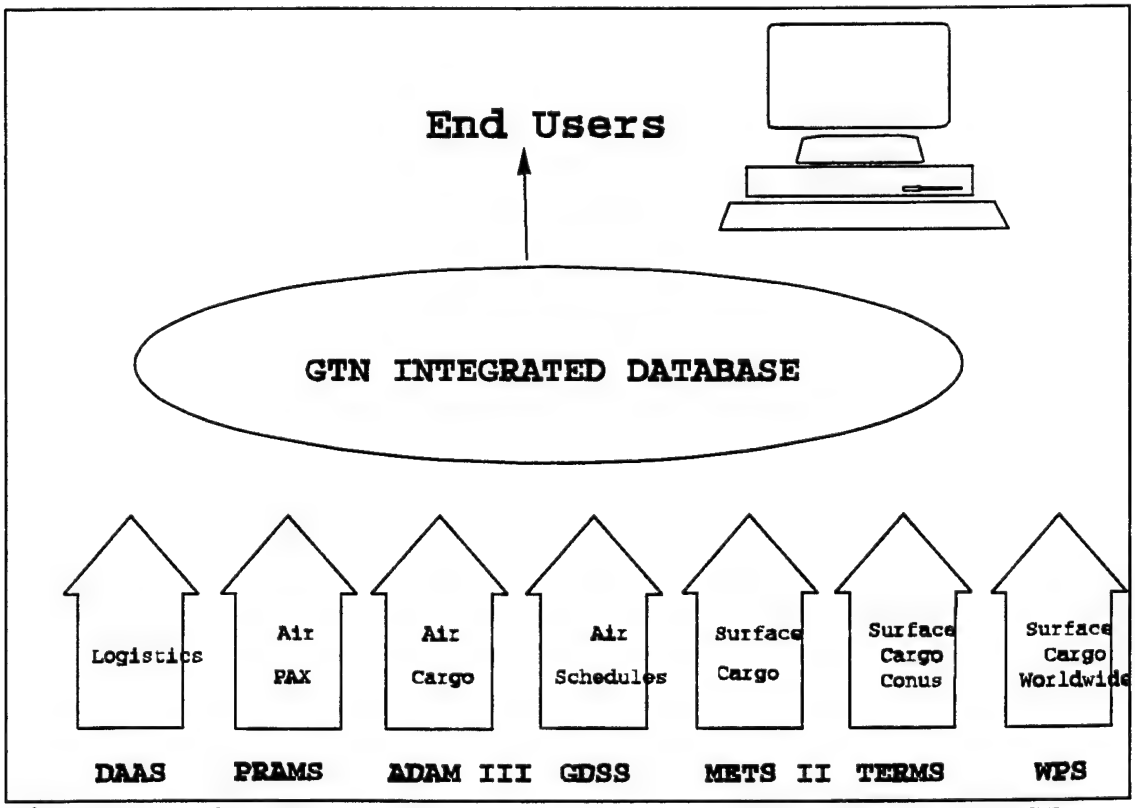


Figure 3 The GTN Prototype Concept (GTN USERS' COURSE, P.1-4, 30 September 1994)

Once access has been approved the user will be provided a USERID and password to logon to the GTN Prototype. Connection to the Prototype can be accomplished by any of the following methods:

- Direct connection to the Prototype through the Scott AFB LAN.
- Remote connection with a personal computer (PC) and modem via the GTN Prototype Defense Switched Network (DSN) or commercial phone number.
- Access via the MILNET connection to the GTN Prototype. The Milnet is a series of military computer systems electronically linked together. The MILNET can be accessed through a modem and PC via a Terminal Access Control (TAC), a connection to any host computer on the MILNET, or any LAN connected to the MILNET.
- Remote connection via the Defense Simulation Internet (DSI). The DSI is a testbed for the simulation community and is not guaranteed uninterrupted service to the GTN Prototype nor operational support from USTRANSCOM.

(GTN USERS MANUAL, pp. 3-3 - 3-12, 29 August 1994)

Training for the Prototype system includes the issuance of a GTN Users Manual (UM) to all users upon access approval, and USTRANSCOM offers a four-day training course that includes a GTN training manual with online exercises.

The GTN Prototype is a query-based system having two fundamental actions: query and output. The Prototype allows the user to compose a query and then responds by providing output according to the parameters choosen by the user.

C. QUERIES

To perform a query on the GTN Prototype the user must successfully navigate through three sequential screens: GTN

Master Menu, GTN Main Menu, and the Parameters Menu. It is important to note that not all the menu and command options displayed on the Prototype screens are functional. Only those menu and command options that are functioning will be discussed in the description of the Prototype.

1. GTN Master Menu

Upon connecting to the system and entering the correct USERID and password the user enters the GTN Master Menu screen, Figure 4. The GTN Master Menu provides the following options for users:

- **GTN User Interface:** provides access to the GTN Main Menu where all queries begin;
- **File Utilities:** allows the user to access the file utilities menu for performing e-mail functions and a range of file utility options such as downloading and deleting files;
- **Change Password:** users can change their password when they choose or the system will prompt the user to do so after 90 days;
- **GTN Tutorial:** not available;
- **Exit:** exits the GTN Prototype.

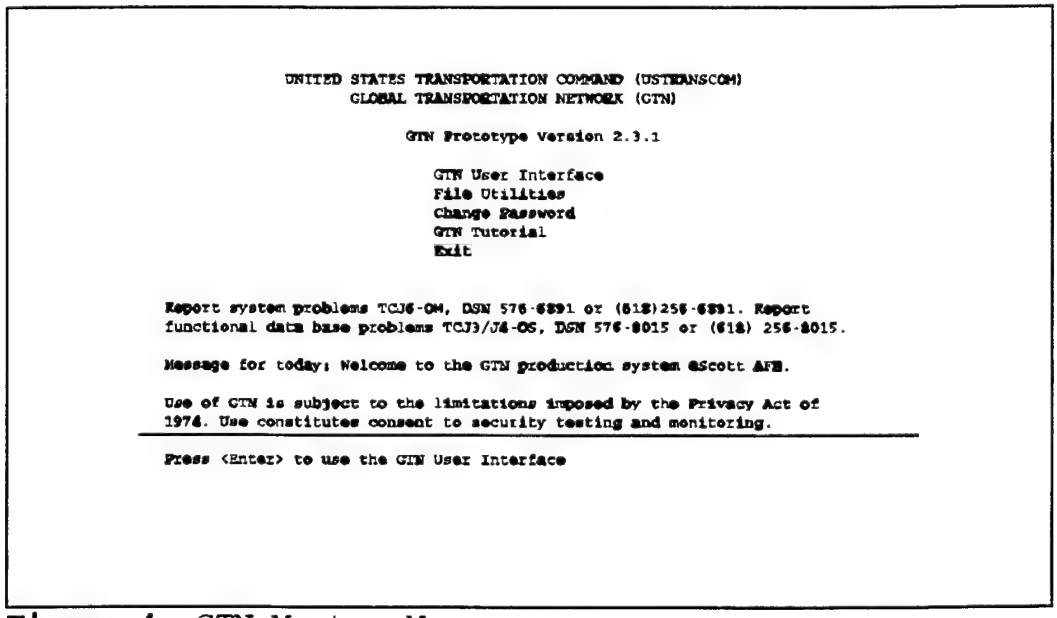


Figure 4 GTN Master Menu

The GTN Master Menu also provides phone numbers to report system and functional database problems. Additionally, the GTN Master Menu will display current "GTN Announcements" with useful information such as scheduled system downtimes.

2. GTN Main Menu

After selecting GTN User Interface from the GTN Master Menu the user is next presented with the GTN Main Menu, Figure 5. This is the menu where all queries begin.

The top portion of the screen is the Title line and it provides reference information such as the Julian date and Greenwich Mean Time (GMT). This information remains in the upper left corner throughout the query and is particularly useful as much of the output information is in Julian date and GMT format.

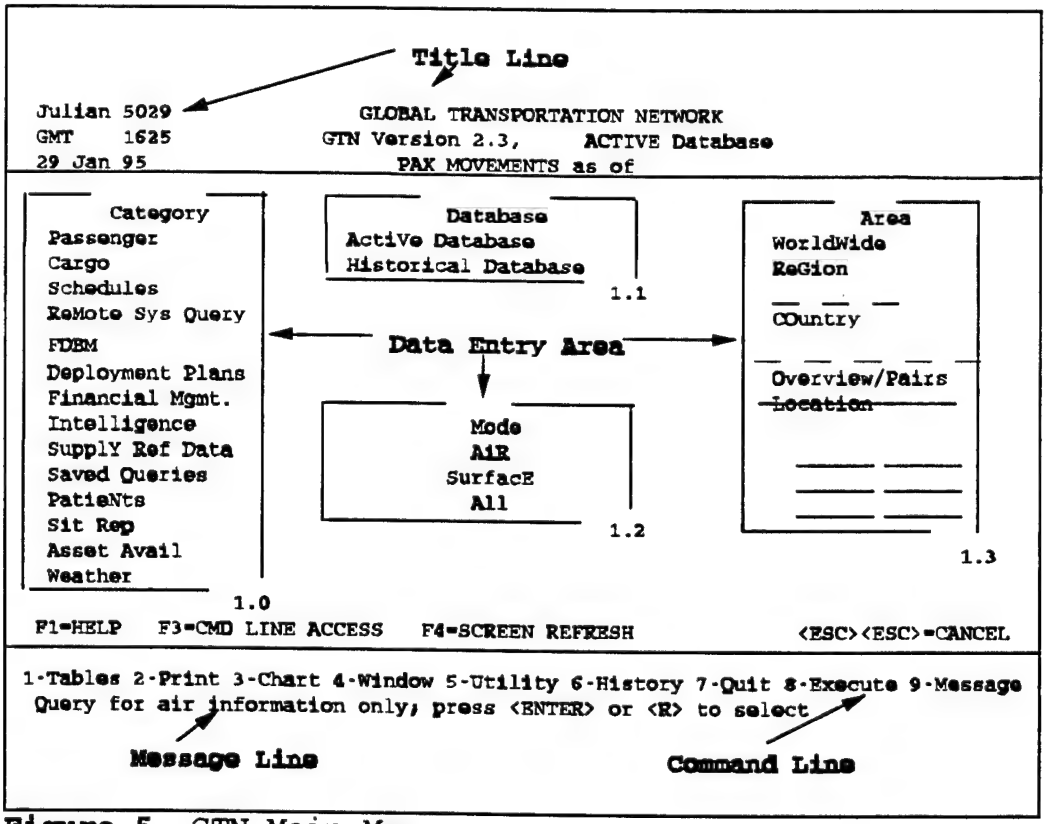


Figure 5 GTN Main Menu

Additionally, the Title line contains information on when the selected category of information was last updated. For example, if the user is doing a passenger query the title line will display a message, "PAX MOVEMENTS as of", detailing the most recent update to the passenger database.

Following the title line is the data entry area composed of the Category, Database, Mode, and Area fields. Currently, there are only three Category choices available: Passenger, Cargo, and Schedules. The Category is the first choice the user makes and will determine many of the options and output further in the query as each category has different data and characteristics.

In the Database field only the Active Database is available and the user cannot make any selections in this area. The Active Database contains air information for the previous 45 days and surface data for the previous 60 days. (GTN User Manual, p. 3-21, 29 August 1994)

After the user selects the Category, the Prototype moves directly to the mode field. The Mode allows the user to choose between Air and Surface for their selected Category of Passenger, Cargo or Schedule (only Air Passenger queries are available). The All function of the Mode is currently not available.

The Area feature allows the user to select the degree of geographic detail for their query. Selecting Worldwide performs a search of the entire Prototype database. The Overview/Pairs function allows the user to select up to three specific transportation corridors to review, for example visibility of all AMC flights from Dover AFB to Travis AFB. The Location function allows the user to select up to six different locations to examine transportation activity, for example, visibility of all surface cargo for Pusan, Republic of Korea.

Input to the Overview/Pairs and the Location function

of the Area menu for air queries must be in the form of Military Standard Transportaion and Movement Procedures (MILSTAMP), Geographic Location Code (GEO), or International Civil Aviation Organization (ICAO) codes. For surface queries the input must be in the form of MILSTAMP, GEO, or Defense Fuel Supply Center (DFSC) codes. Fortunately, the GTN prototype provides an online help feature when selecting Overview/Pairs or Location that allows the user to find and enter the appropriate codes without having to manually look them up. The user need only know the name of the area for which they wish to perform their query.

Near the bottom of the GTN Main Menu screen is the Command line. The Command line contains reference and utility information available throughout both the query and output. Options include:

- **Tables**: an online reference of information helpful to query and interpret data. The codes available are shown in Figure 6.

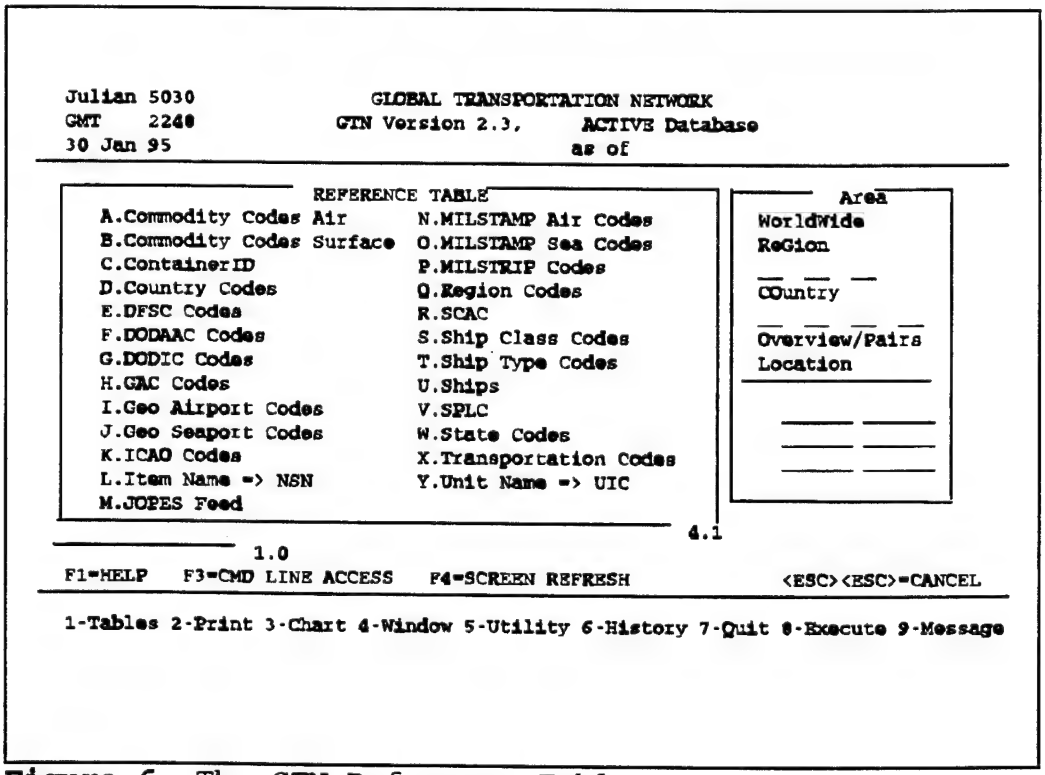


Figure 6 The GTN Reference Tables

- **Print**: this function allows users connected to the Scott AFB LAN to print their queries and output.
- **Chart**: not available.
- **Window**: allows the user to perform and keep active two queries and move between them.
- **Utility**: allows the user access to the same file and email utility as the GTN Master Menu.
- **History**: not available.
- **Quit**: exit to the GTN Master Menu.
- **Execute**: perform the query with the current data entered.
- **Message**: provides access to the Comment and Technical reports of the system as well as email.

The last line on the Main Menu screen, displayed throughout the query and output, is the Message line. The Message line provides helpful information on the menu item or command highlighted by the cursor.

3. Parameters Screen

Once all the applicable entries have been made in the GTN Main Menu the user next moves to the Parameters Menu Figure 7. In the Parameters Menu the user narrows the scope of their query by entering additonal data. The narrower the scope of the query and the more data entered, the faster the Prototype will execute the query. However, it is important to note that very little information actually needs to be entered in the parameters screen to execute a query. The Prototype provides for the use of a wild card, "*", that instructs the system to search its entire database.

The user must decide what data element they want to use for the GTN Prototype to conduct its search. There are several choices for entry, and they differ depending on whether the user is conducting a Passenger, Cargo, or

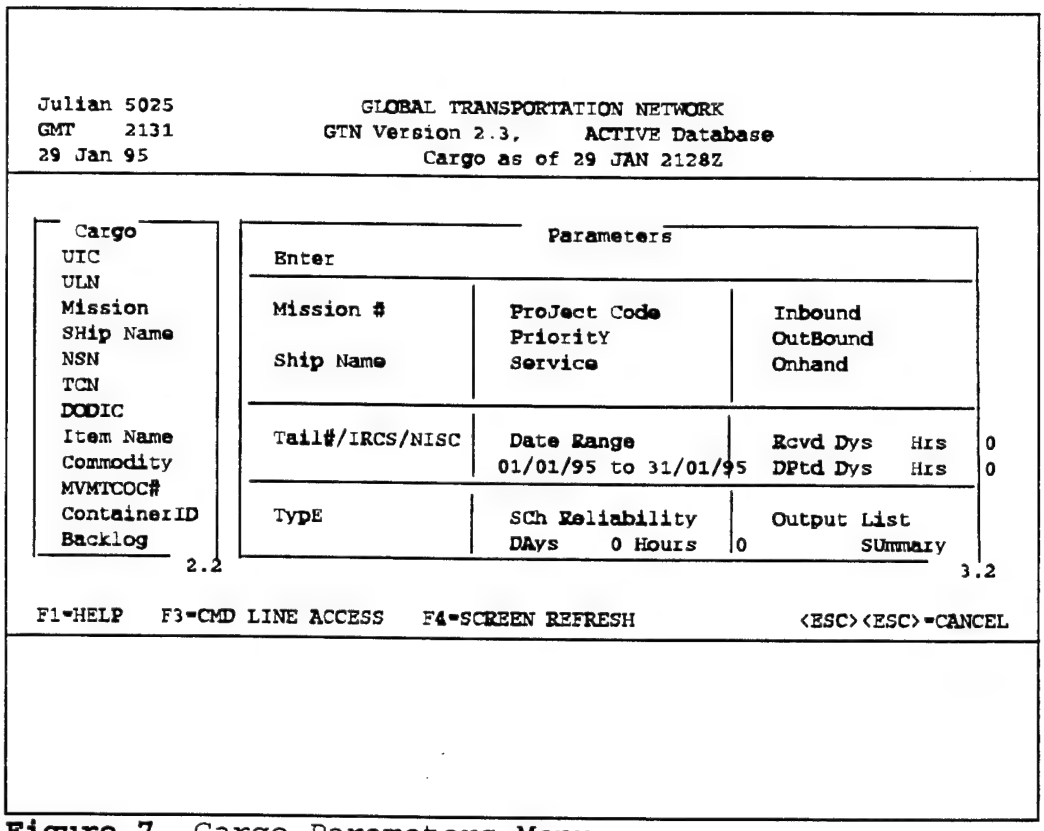


Figure 7 Cargo Parameters Menu

Schedules query. The available data elements, displayed in Figure 7, currently available for cargo include:

- **UIC**: Unit Identification Code.
- **ULN**: Unit Line Number.
- **Mission**: AMC aircraft mission number.
- **Ship Name**: Surface ship name.
- **NSN**: National Stock Number.
- **TCN**: Transportation Control Number.
- **DODIC**: Department of Defense Identification code for ammunition.
- **Item Name**: The name of the item being queried.

Once the data element for the search has been entered, the user enters the Parameters section of the Parameters Menu. In the Parameters section the user continues to narrow their query by entering data in applicable fields

such as a date range, and chooses the level of output detail for their query through the "List" and "Summary" commands. When the Parameter menu is complete, the GTN Prototype will execute the query and provide the the user with an output.

D. OUTPUT

The output information will depend on the Category from the GTN Main Menu and Output selected in the Parameters Menu. Output List will provide detailed information, while Summary will provide broader, overview information for a user's query. To illustrate the output of the GTN Prototype an example of each of the query Categories, Passenger, Cargo, and Schedules; will be demonstrated.

1. Passenger

For the Passenger example, a user needs information on passengers scheduled inbound to Anderson AB, Guam onboard AMC owned or chartered flights for the month of January 1995. To begin, they would start in the GTN Main Menu, Figure 5, by choosing Category: Passengers, Mode: Air, Area: Location with the appropriate code for Anderson AB, Guam entered.

After those entries are complete, the user would enter the Passenger Parameters Menu, Figure 8. The user, not looking for a specific passenger or flight, uses the data element "Mission" for the search. In the Parameters section, the GTN Prototype wildcard "*" is entered into the "Mission #" field which instructs the Prototype to search its entire database for all missions for the selected location, Anderson AB, Guam.

Next, the Date Range of the query is entered for the month of January 1995. Inbound or Outbound is the next choice the user has to make, and for this query the user is interested in Inbound. Output is the remaining field and

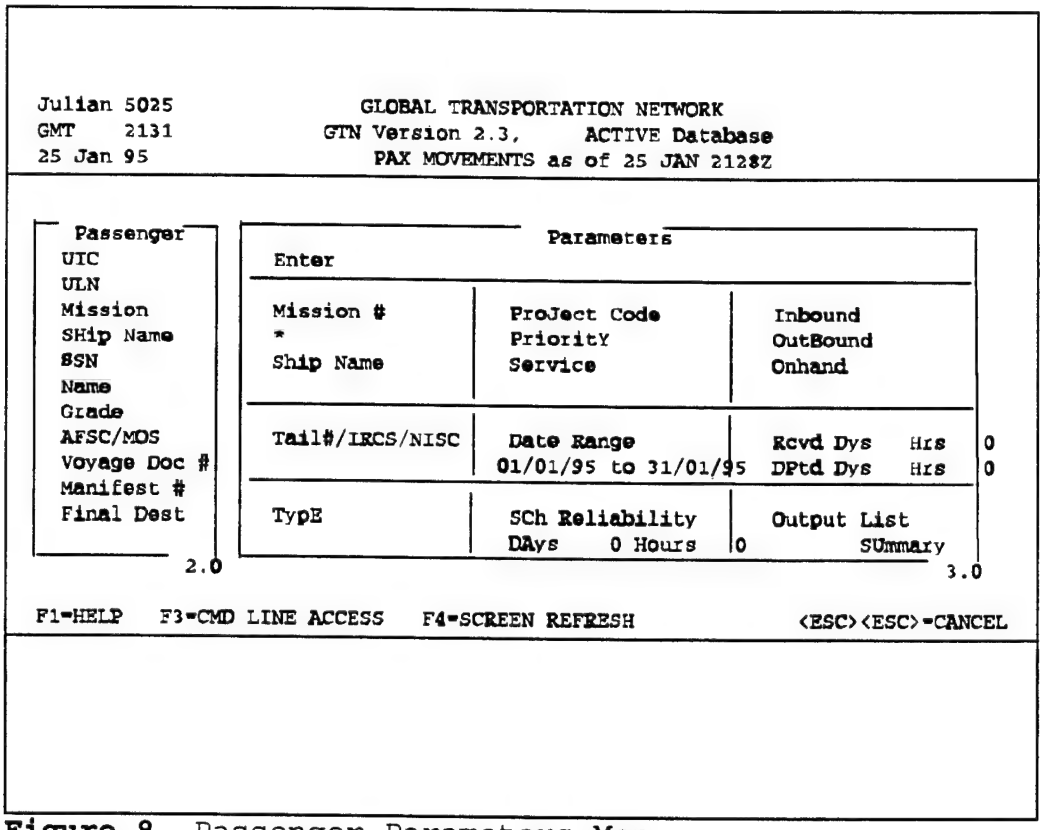


Figure 8 Passenger Parameters Menu

the user chooses Summary.

The GTN Prototype executes the query and provides the Summary output represented in Figure 9. The aircraft type (AC Type), number of aircraft (# AC), passengers in (#PAX IN), and passengers through (#PAX THRU) information is furnished. The "Current Date" in the top right corner is for the very first mission, informing the user that one C141B with 0 passengers was scheduled for Anderson AB, Guam for 01/01/95. As the user cursors through the list the "Current Date" advances through the date range selected. Additionally, the lower right corner displays the information that the user is on "Record 1 of 42" informing the user how many records there are and the record number they are currently viewing.

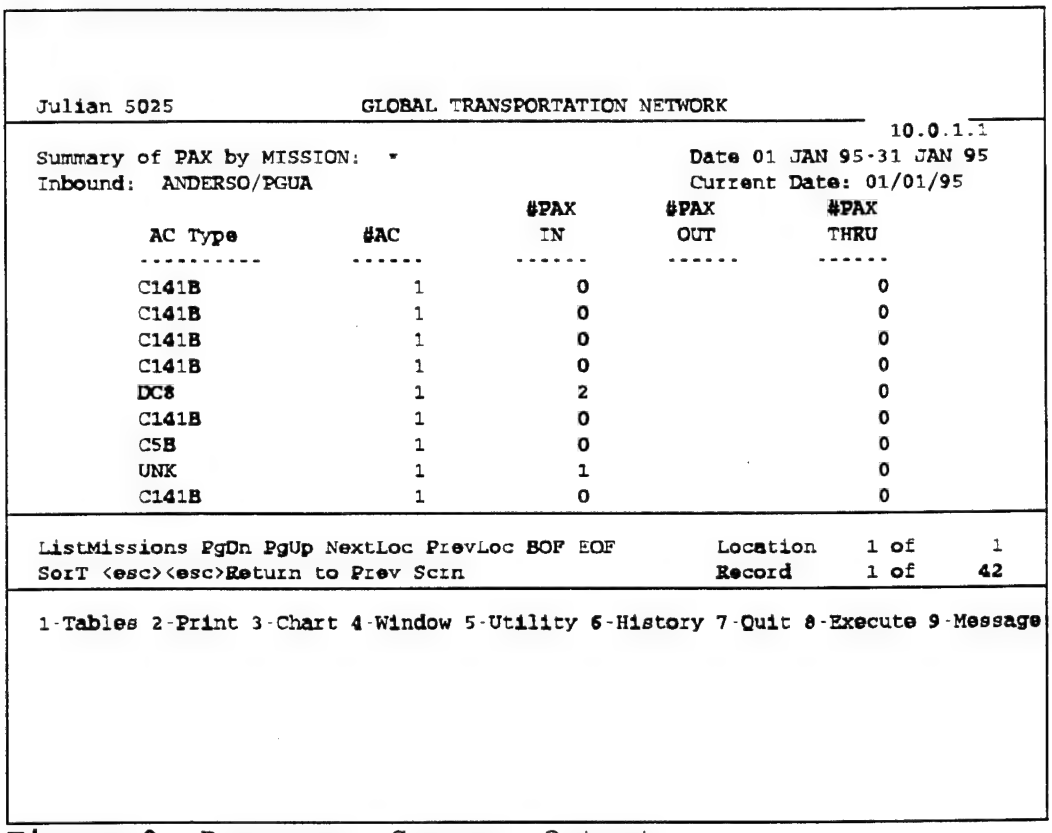


Figure 9 Passenger Summary Output

Near the bottom of the screen the user is presented with some further choices in the Report Options line. The user can "List Missions" which will provide the same output as the "List" function in the Parameters Menu. The user can move through the query by choosing Page Down (PgDn), Page Up (PgUp), Beginnining of File (BOF) or End of File (EOF). There is also the opportunity to choose Next Location (NextLoc) or Previous Location (PrevLoc). If more than one Location had been choosen in the Area field of the GTN Main Menu, the NextLoc or PrevLoc could be used to move between the different areas of the query.

If the user needs more detailed information the List function of the Parameters Menu or the List Missions

function of the Summary output screen could be chosen. Choosing List provides the information depicted in Figure 10.

The List screen displays the aircraft mission number (Mission #), where the flight originated from, passengers in and through, the type aircraft, and the estimated time of arrival (ETA) and actual time of arrival (ATA).

The List screen also provides the user with some Report Options not available in the Summary output. The user can choose to view a selected aircraft's passenger manifest (SHowMnfst) or itinerary (Itinry).

Choosing to view the passenger manifest for mission LQC744900005 from Yokota AB, Japan provides the screen depicted in Figure 11. The manifest shows the service

```
Julian 5025                GLOBAL TRANSPORTATION NETWORK
                                                          10.0.1.0
PAX by MISSION:  *                          Date 01 JAN 95-31 JAN 95
Inbound:  ANDERSO/PGUA                      Current Date: 01/01/95

                                  PAX   PAX   PAX
  Mission #        From           IN    OUT   THRU  AC Type    ETA   ATA
 -----------  -----------         ----  ----  ----  ---------  ----  ----
 PMXJ102CP365 HONOLUL/PHNL          0           0  C141B      1615  1631
 AQP07K200002 OSAN/RKSO             0           0  C141B      1550
 PLM101101003 YOKOTA/RJTY           0           0  C141B      1535  1516
 TQCVZ9000003 YOKOTA/RJTY           2           0  DC8        0100  0040
 PAM182501002 HICKAM /PHIK          0           0  C141B      0915  0856
 LQC7449Y0004 YOKOTA/RJTY           0           0  C130E      0420  0426
 PAM207701003 HICKAM /PHIK          0           0  C5B        0945  0325
 LQC744900005 YOKOTA/RJTY           1           0  UNK        1125
 DC8003991003 HICKAM /PHIK          0           0  KC135E     0235  0234

Summary SHowMnfst Itinry Rmks NextLoc PrevLoc BOF EOF Location    1 of     1
SorT PgDn PgUp <esc><esc>Return to Params Menu        Record      1 of    45

1-Tables 2-Print 3-Chart 4-Window 5-Utility 6-History 7-Quit 8-Execute 9-Message
```

Figure 10 Passenger List Output

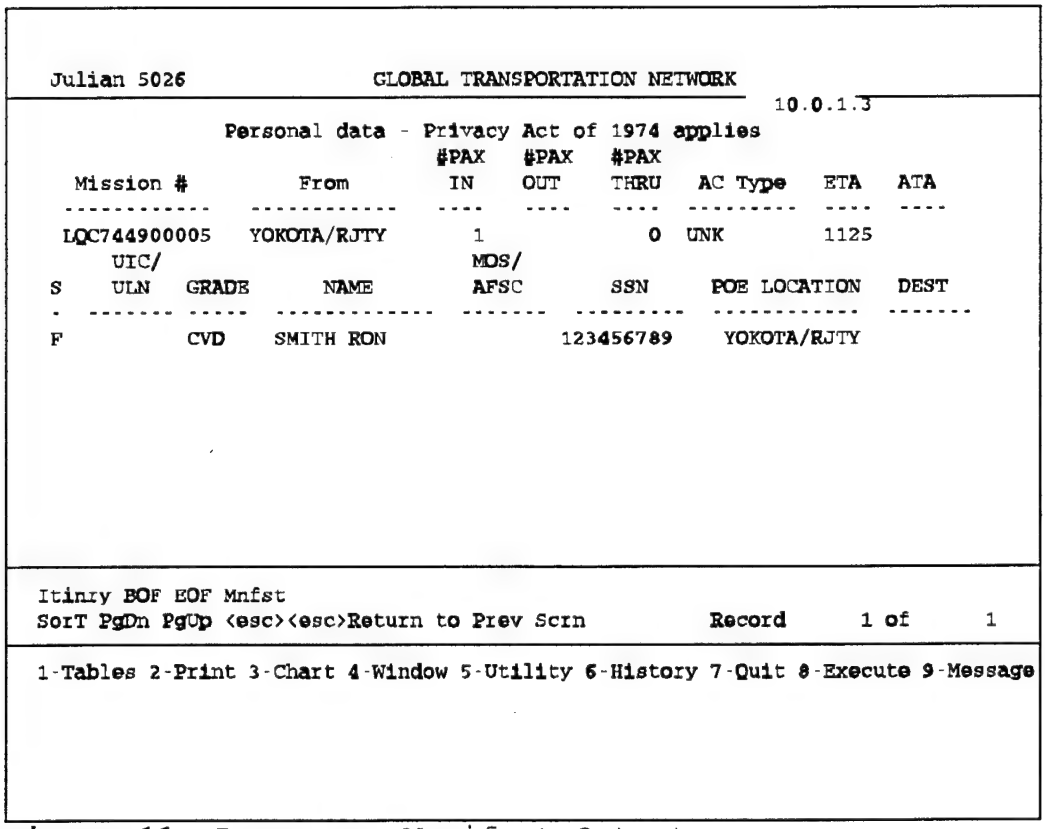


Figure 11 Passenger Manifest Output

(S), Grade, Name, SSN, and point of embarkation (POE) for each manifested passenger. The UIC/ULN and MOS/AFSC data are not entered into the source system and thus, limits the capability of the Prototype to execute queries based on these data elements.

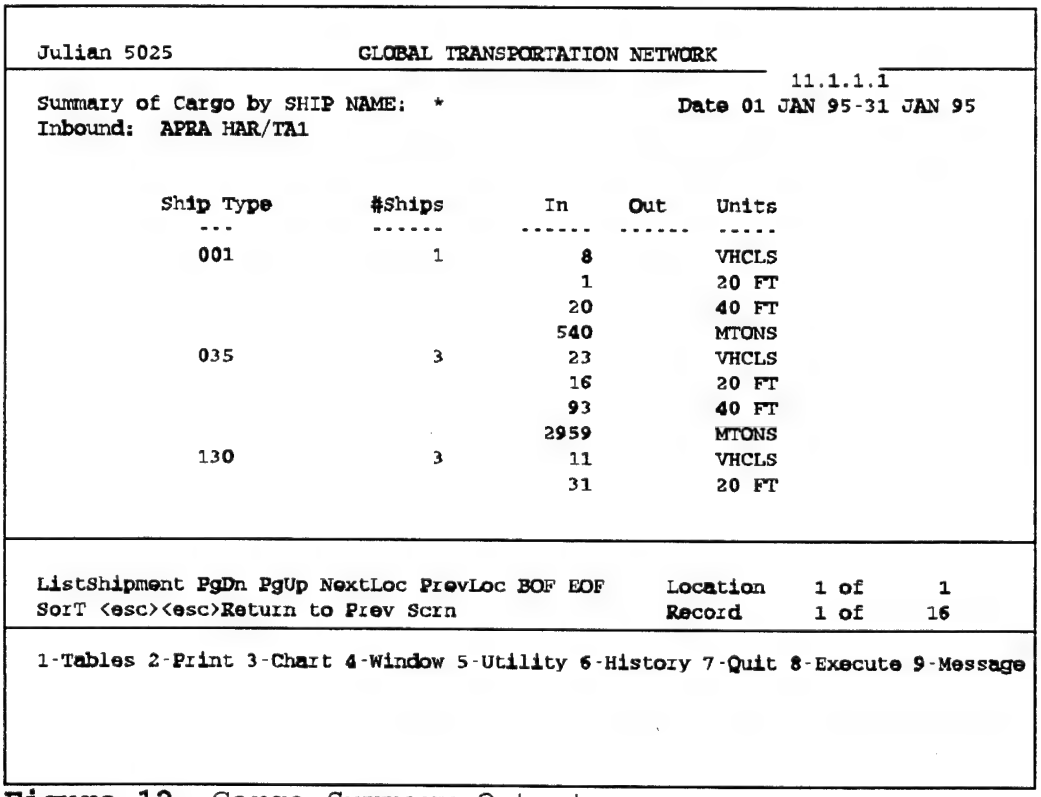
2. Cargo

For the Cargo example the user needs information on surface cargo entering Apra Harbor, Guam for the month of January 1995. In this query the user selects Category: Cargo, Mode: Surface, Area: Location with the appropriate location code for Apra Harbor, Guam from the GTN Main Menu.

The user is then presented with the Cargo Parameters Menu, as shown previously in Figure 7 and chooses Ship Name as the data element for the query. The wildcard "*" is

used in the Ship Name field to instruct the Prototype to search its entire database of ships for Apra Harbor, Guam. Inbound and Summary are the remaining two parameters choosen before the system executes the query.

When the query is complete the Prototype displays the Summary output represented in Figure 12. In the surface cargo Summary screen the data is grouped by Ship Type with ship codes that can be found in the Tables function of the Command line, number of ships (#SHIPS), units in (In) and a description of the units (Units). For example, the ouput shows three type 035 ships (Container Ships), are inbound to Apra Harbor with twenty three vehicles, sixteen 20 foot containers, and ninety three 40 foot containers.

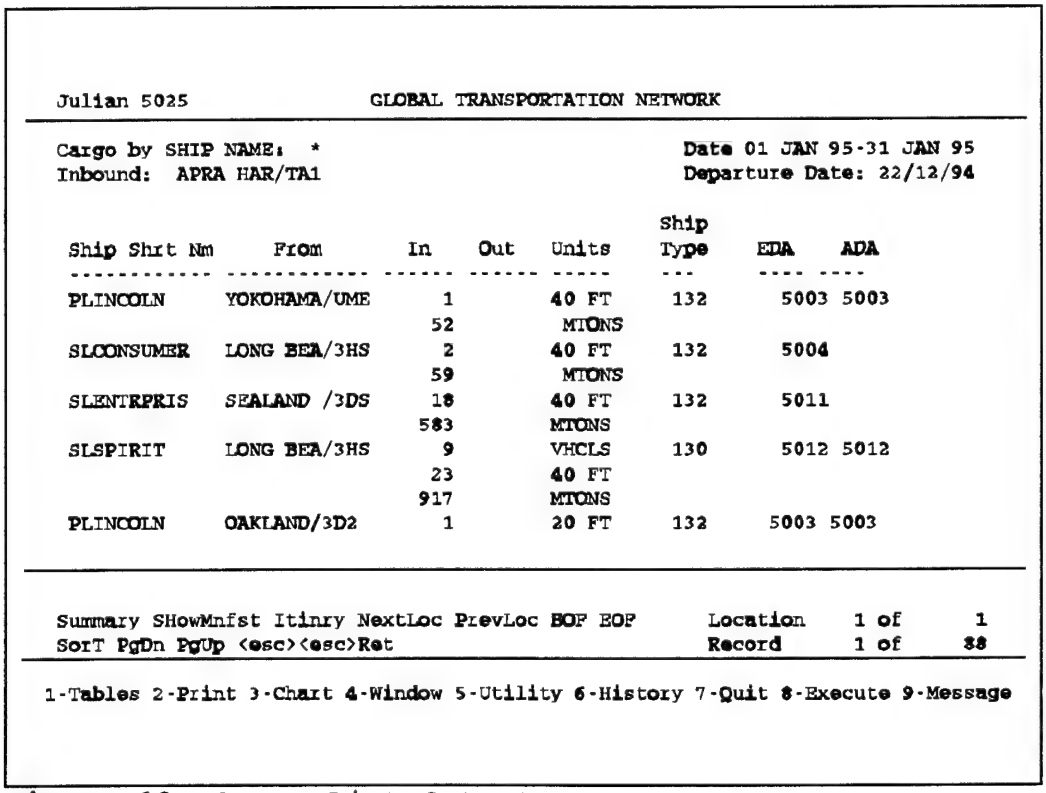


```
Julian 5025              GLOBAL TRANSPORTATION NETWORK
                                                          11.1.1.1
Summary of Cargo by SHIP NAME:  *                Date 01 JAN 95-31 JAN 95
Inbound:  APRA HAR/TA1

        Ship Type      #Ships        In     Out    Units
           ---         ------      ------  ------  -----
           001              1           8          VHCLS
                                        1          20 FT
                                       20          40 FT
                                      540          MTONS
           035              3          23          VHCLS
                                       16          20 FT
                                       93          40 FT
                                     2959          MTONS
           130              3          11          VHCLS
                                       31          20 FT

ListShipment PgDn PgUp NextLoc PrevLoc BOF EOF     Location    1 of     1
SorT <esc><esc>Return to Prev Scrn                 Record      1 of    16

1-Tables 2-Print 3-Chart 4-Window 5-Utility 6-History 7-Quit 8-Execute 9-Message
```

Figure 12 Cargo Summary Output

Choosing ListShipment from the Report Options allows the user to view much more detailed information as represented by Figure 13. It provides the Ship Short Name (Ship Shrt Nm), port it originated from (From), number of units in (In), a description of the units (Units), the Ship Type and the estimated (EDA) and actual day of arrival (ADA). Additionally, in the top right corner is the departure date for the ship currently selected.

At the bottom of the screen in the Report Options, the user is presented with choices similar to those available in the passenger list output screen. The user can select Summary which will provide the same summary data as if selected from the Parameters Menu, display the ships manifest (SHowMnfst), the ships itinerary (Itinry), and the same commands to move through the query.



```
Julian 5025                GLOBAL TRANSPORTATION NETWORK

Cargo by SHIP NAME: *                          Date 01 JAN 95-31 JAN 95
Inbound:  APRA HAR/TA1                         Departure Date: 22/12/94

                                                          Ship
Ship Shrt Nm      From          In     Out    Units      Type    EDA   ADA
------------ ------------ ------ ------ -----           ---     ---- ----
PLINCOLN     YOKOHAMA/UME      1         40 FT          132       5003 5003
                              52          MTONS
SLCONSUMER   LONG BEA/3HS      2         40 FT          132       5004
                              59          MTONS
SLENTRPRIS   SEALAND /3DS     18         40 FT          132       5011
                             583         MTONS
SLSPIRIT     LONG BEA/3HS      9         VHCLS          130       5012 5012
                              23         40 FT
                             917         MTONS
PLINCOLN     OAKLAND/3D2       1         20 FT          132       5003 5003

Summary SHowMnfst Itinry NextLoc PrevLoc BOF EOF      Location    1 of      1
SorT PgDn PgUp <esc><esc>Ret                          Record      1 of     88

1-Tables 2-Print 3-Chart 4-Window 5-Utility 6-History 7-Quit 8-Execute 9-Message
```

Figure 13 Cargo List Output

If the user chooses SHowMnfst they will be provided the information displayed in Figure 14. It shows the TCN, weight (# lbs), set date (Set), priority (PRI), Location and destination (Dest).

If more detailed information is needed the user can choose to see the contents through the ShowCnts command in the Report Options line. Choosing ShowCnts for TCN N626492830V236LLA in Figure 14 provides the information displayed in Figure 15.

To determine what the shipped item is the user can choose NSNInfo from the Report Options line. Choosing NSNInfo will provide a pop-up box with an item description and handling information as shown in Figure 16.

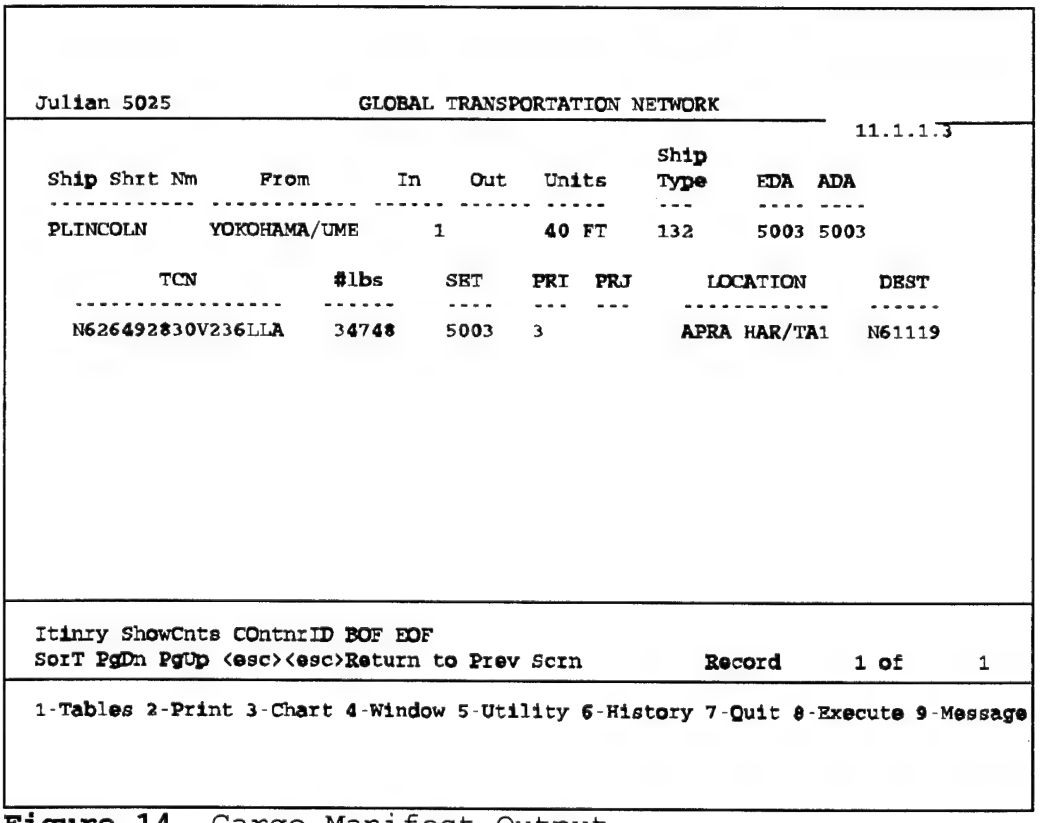


Figure 14 Cargo Manifest Output

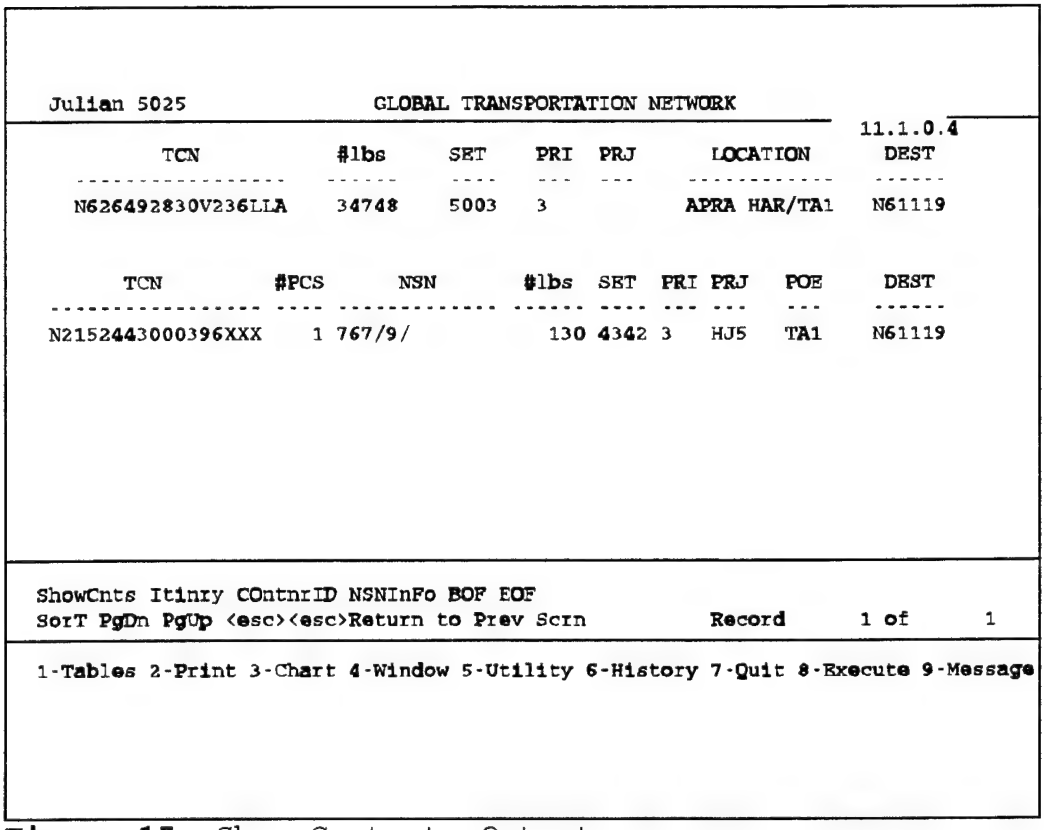


Figure 15 Show Contents Output

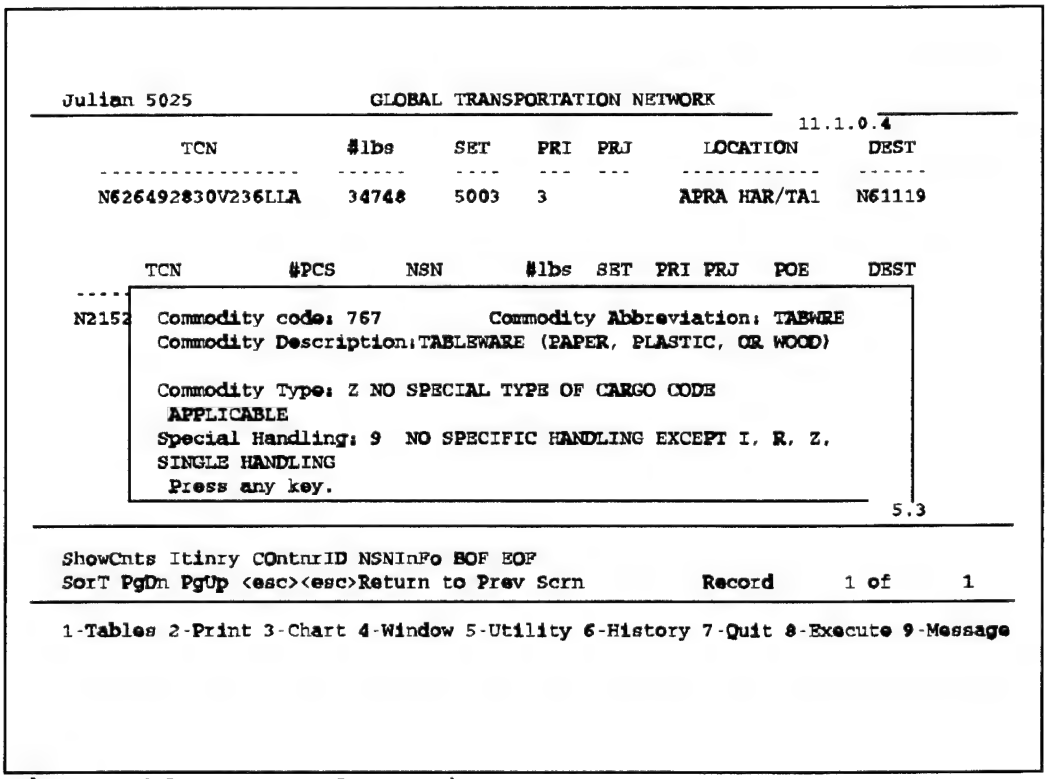


Figure 16 NSN Information

With the information available in Figures 15 and 16 the GTN user can now trace and identify the shipment. Using the Tables function of the Command line to identify the UIC's (first letter and five numbers of the TCN and destination) in Figure 15 the user can determine the origin, destination, and ultimate consignee of the cargo.

For example, the container TCN N62649 is from the Naval Supply Depot (NSD) Yokosuka, Japan, the TCN of the requisitioned item N21524 represents the USNS John Ericsson (TAO 194) a Military Sealift Command ship, and the TCN for the destination N61119 is for NSD Guam. Finally, the identitiy of the item, as shown in Figure 16, is "TABLEWARE".

Through the GTN Prototype, and as displayed in Figures 15 and 16, the user was able to trace a shipment of tableware originating from NSD Yokosuka, Japan onboard the PLINCOLN arriving on Julian date 5003 (January 3, 1995) at Apra Harbor, Guam to be offloaded and delivered by NSD Guam to the ultimate consignee USNS John Ericsson (TAO 194).

The previous two queries, air passenger and surface cargo, have focused on framing a query for the geographic area of Guam. However, the Prototype can also be effectively used at the unit level to trace passengers and cargo.

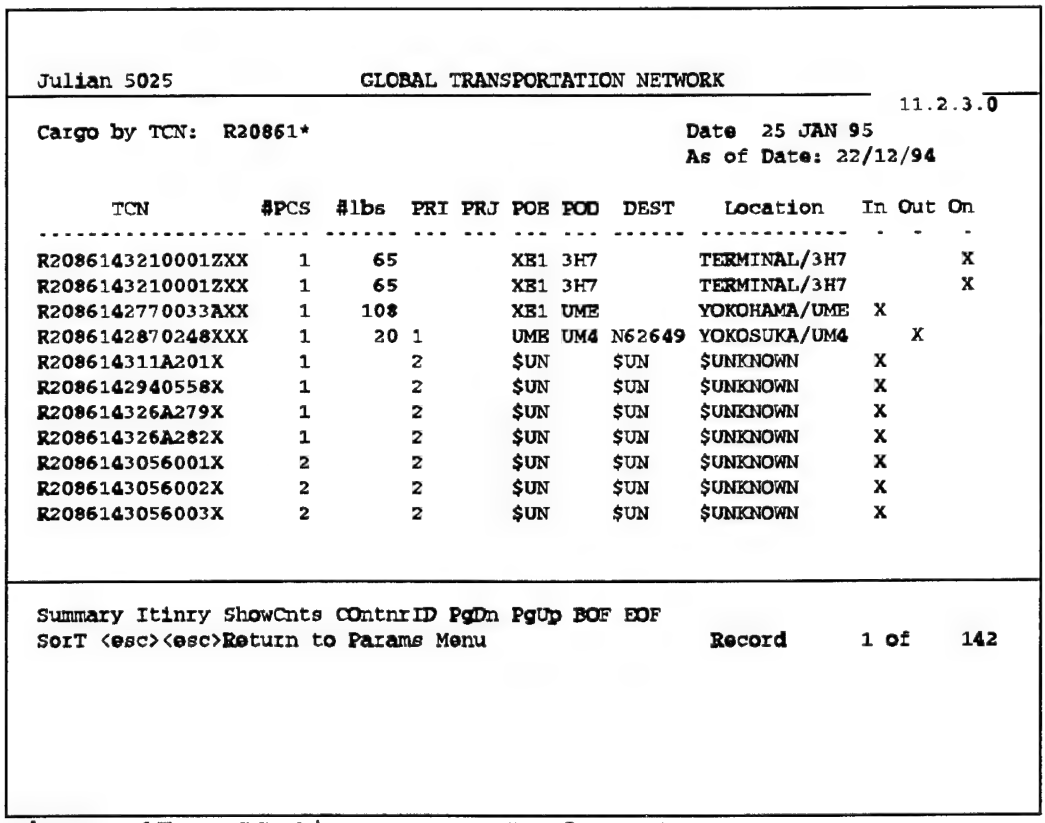
For example, a user could find all the surface cargo in the Prototype database for the USS Cimarron (AO 177) a U.S. Navy oiler homeported in Pearl Harbor, HI. First, the user would start in the GTN Main Menu by selecting Category: Cargo, Mode: Surface, and Area: Worldwide.

In the Cargo Parameters Menu Figure 7, the user would select the data element TCN (Transportation Control Number) and in the Parameters section enter the ship's UIC, R20861, and the wildcard "*". Most U.S. Navy TCN's begin with the receiving units UIC, therefore using the UIC with the

wildcard instructs the Prototype to search its entire database for any TCN beginning with the USS Cimarron's UIC of R20861. The final entry in the Parameters section is the Output for List or Summary.

Choosing List will provide the user with the output represented in Figure 17. This is a detailed list of the ships surface cargo as of 22 December 1994. It shows the TCN, number of pieces (#PCS), number of pounds (#lbs), priority (PRI), port of embarkation (POE), port of debarkation (POD), destination (DEST), current location (Location) and whether the material is inbound, outbound, or onhand.

The Report Options line near the bottem of the screen includes the ability to display Summary, itinerary (Itinry), contents (ShowCnts), container identification (COntnrID),



```
Julian 5025              GLOBAL TRANSPORTATION NETWORK          11.2.3.0

Cargo by TCN:  R20861*                          Date  25 JAN 95
                                                As of Date: 22/12/94

      TCN          #PCS  #lbs  PRI PRJ POE POD  DEST    Location    In Out On
---------------- ---- ------ --- --- --- --- ------ ------------ - - -
R2086143210001ZXX    1     65          XE1 3H7        TERMINAL/3H7        X
R2086143210001ZXX    1     65          XE1 3H7        TERMINAL/3H7        X
R2086142770033AXX    1    108          XE1 UME        YOKOHAMA/UME  X
R2086142870248XXX    1     20 1        UME UM4 N62649 YOKOSUKA/UM4     X
R208614311A201X      1      2          $UN     $UN    $UNKNOWN      X
R2086142940558X      1      2          $UN     $UN    $UNKNOWN      X
R208614326A279X      1      2          $UN     $UN    $UNKNOWN      X
R208614326A282X      1      2          $UN     $UN    $UNKNOWN      X
R2086143056001X      2      2          $UN     $UN    $UNKNOWN      X
R2086143056002X      2      2          $UN     $UN    $UNKNOWN      X
R2086143056003X      2      2          $UN     $UN    $UNKNOWN      X

Summary Itinry ShowCnts COntnrID PgDn PgUp BOF EOF
SorT <esc><esc>Return to Params Menu          Record      1 of    142
```

Figure 17 USS Cimarron's Surface Cargo

and the commands to move through the query.

Choosing the "COntnrID" option for TCN R208614321001ZXX displays a pop-up box as shown in Figure 18. Here the user can find both the container indentification number and TCN for more accurate tracking of material.

The amount of information available for the ship's TCNs depends on the source system that the information was input on. The first four TCN's in Figure 17 each have an "X" in the fifteenth and sixteenth positions indicating they were input through a military surface cargo source system. The remaining TCN's have two fewer positions, indicating they were a requisistion input through the Defense Automated Addressing System (DAAS) a military stock point logistics system.

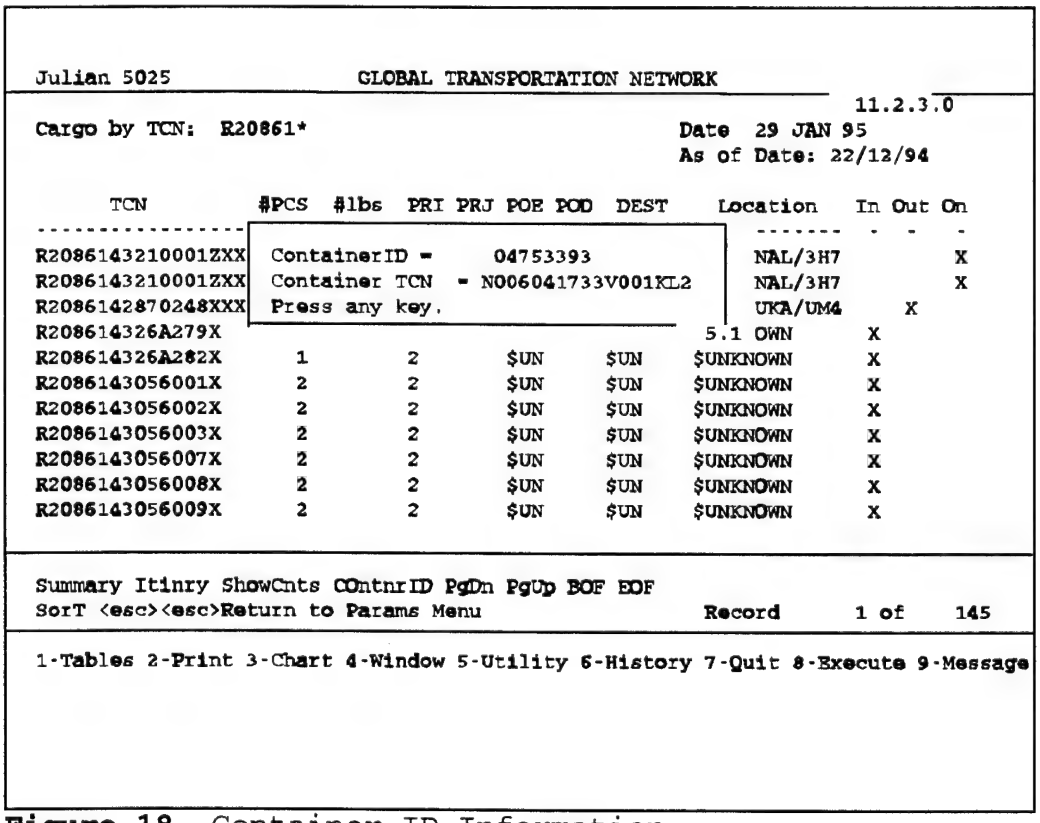


Figure 18 Container ID Information

While the information on the List output, Figure 17, is more complete for the first three TCNs from the transportation source systems, the difference is even more pronounced when more detailed information from the Prototype is examined.

For example, using "Itinry", the command to show the itinerary, for TCN R208614321001ZXX provides information for shipment tracing as depicted in Figure 19. Executing "Itinry" for TCN R208614326A282X, Figure 20, shows most of the fields blank or Unknown and adds nothing more to the shipment query than the estimated time of arrival.

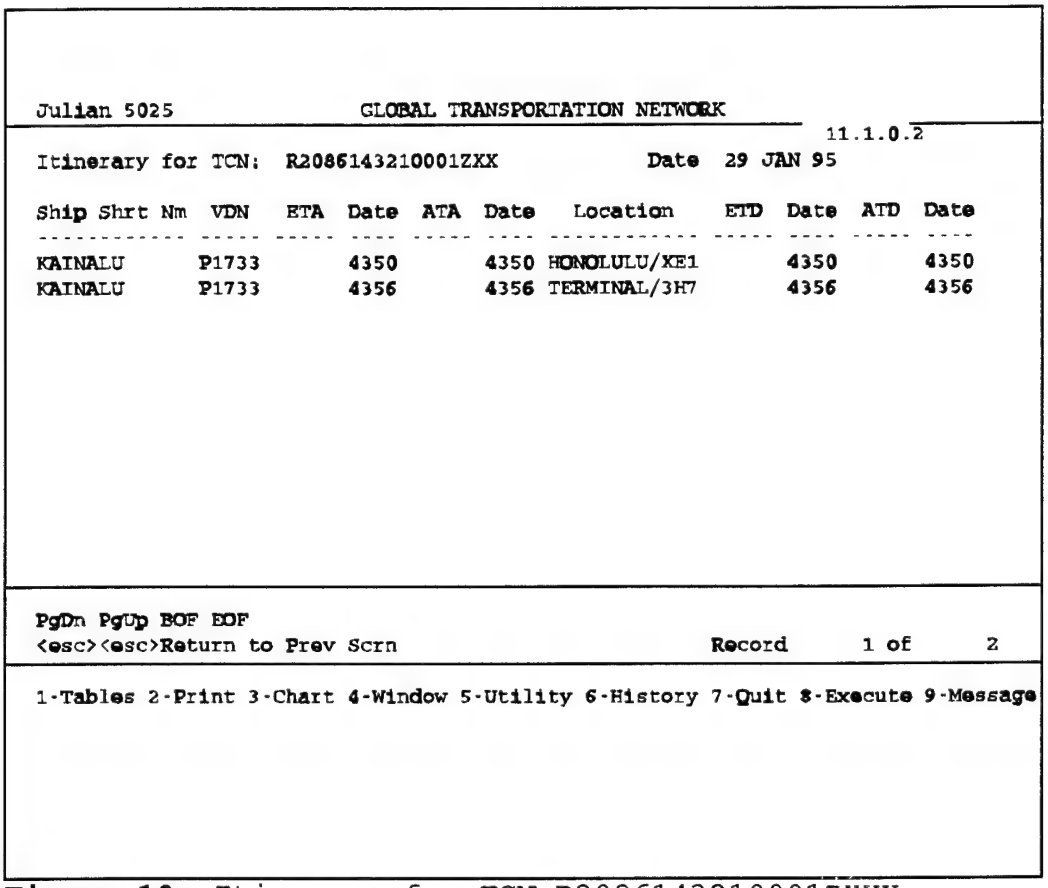


Figure 19 Itinerary for TCN R20861432100001ZXXX

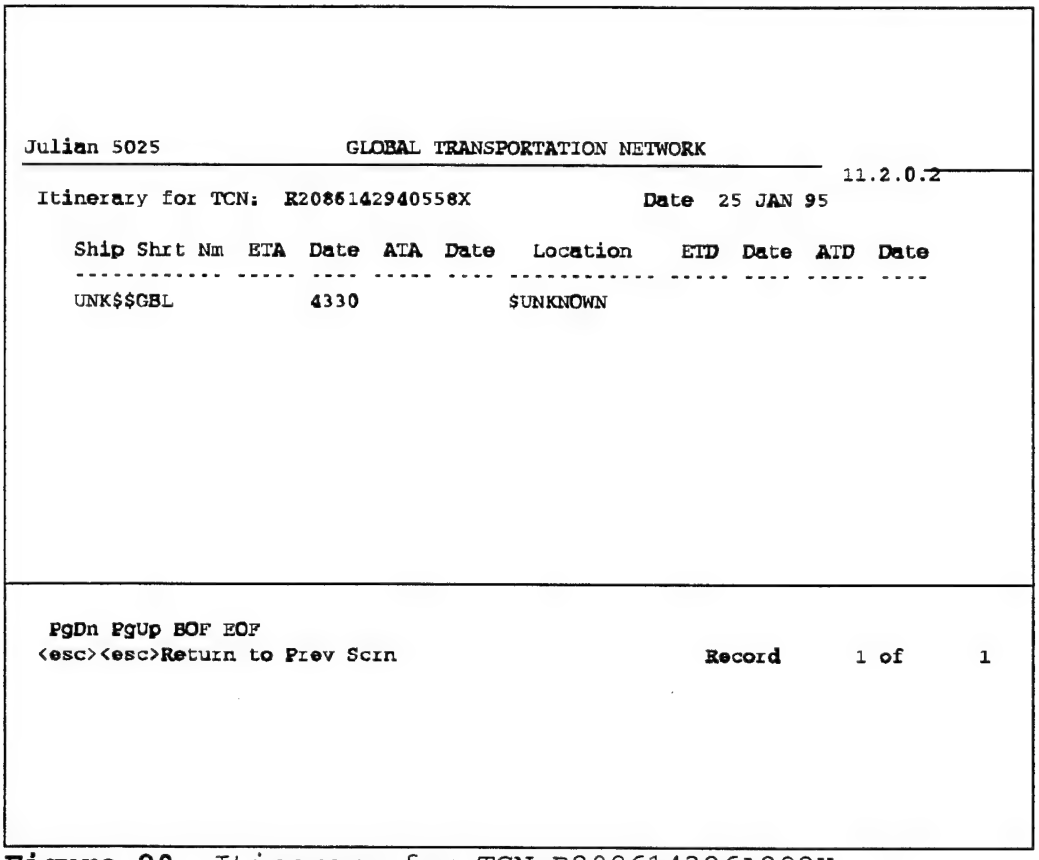


Figure 20 Itinerary for TCN R208614326A282X

3. Schedules

The final Category for conducting a query is Schedules. For this query the user needs to view all the inbound aircraft missions scheduled for Travis AFB, California. The user selects Category: Schedules, Mode: Air and Area: Location with the appropriate code for Travis AFB in the GTN Main Menu.

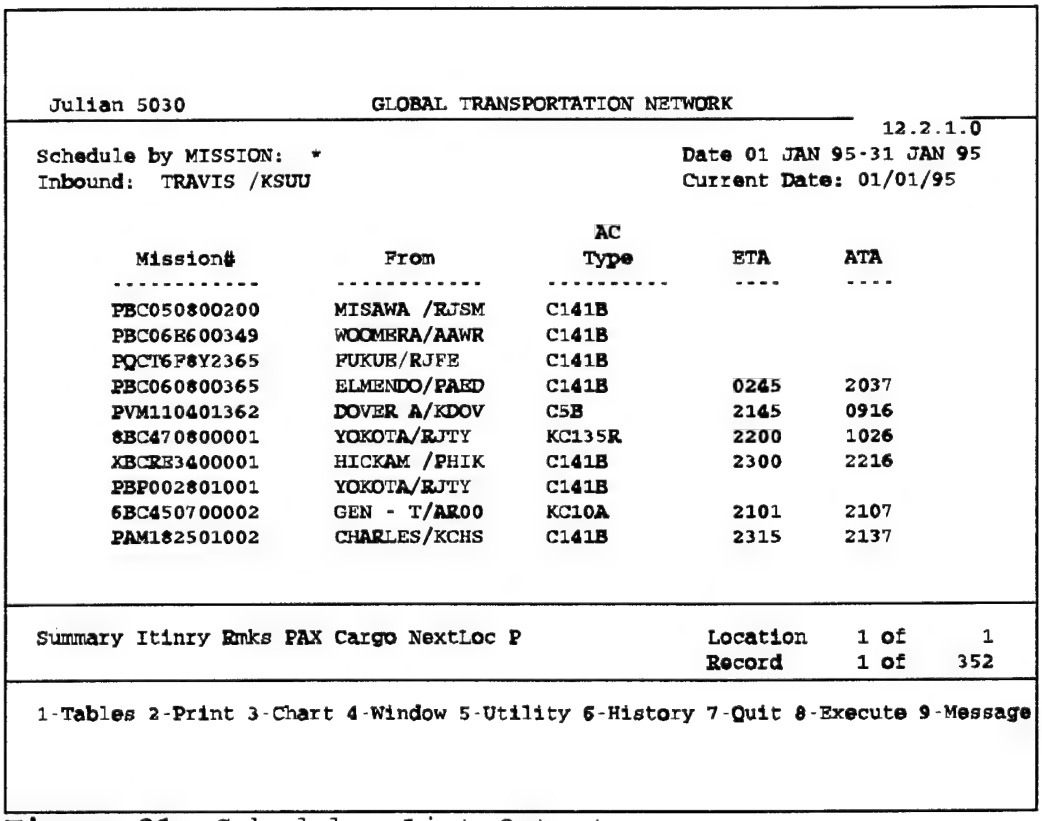
In the Parameters screen, the user selects Mission as the data element and uses the wildcard "*" to search the entire database. The date range for the month of January 1995 is chosen and Inbound and List are the final two parameters.

When the query is complete the user is provided with

the information in Figure 21. It lists all missions (Mission#), where they originated from (From), aircraft type (AC Type), and estimated (ETA) and actual time of arrival (ATA).

The Report Options at the bottom of the screen have in addition to the choices available in previous queries, the ability to view both passengers (PAX) and Cargo.

Choosing Cargo for mission PBC050800200 provides the user with the output shown in Figure 22. It shows the Pallet ID or TCN, number of pounds (#lbs), set date (SET), priority (PRI), Port of Embarkation (POE Location) and destination (DEST). Additonally, both the itinerary (Itinry) and contents (ShowCnts) of the pallets are available for viewing through the Report Options.



Julian 5030 GLOBAL TRANSPORTATION NETWORK 12.2.1.0

Schedule by MISSION: *
Inbound: TRAVIS /KSUU

Date 01 JAN 95-31 JAN 95
Current Date: 01/01/95

Mission#	From	AC Type	ETA	ATA
PBC050800200	MISAWA /RJSM	C141B		
PBC06B600349	WOOMERA/AAWR	C141B		
PQCT6F8Y2365	FUKUE/RJFE	C141B		
PBC060800365	ELMENDO/PAED	C141B	0245	2037
PVM110401362	DOVER A/KDOV	C5B	2145	0916
6BC470800001	YOKOTA/RJTY	KC135R	2200	1026
XBCRE3400001	HICKAM /PHIK	C141B	2300	2216
PBP002801001	YOKOTA/RJTY	C141B		
6BC450700002	GEN - T/AR00	KC10A	2101	2107
PAM182501002	CHARLES/KCHS	C141B	2315	2137

Summary Itinry Rmks PAX Cargo NextLoc P Location 1 of 1
Record 1 of 352

1-Tables 2-Print 3-Chart 4-Window 5-Utility 6-History 7-Quit 8-Execute 9-Message

Figure 21 Schedules List Output

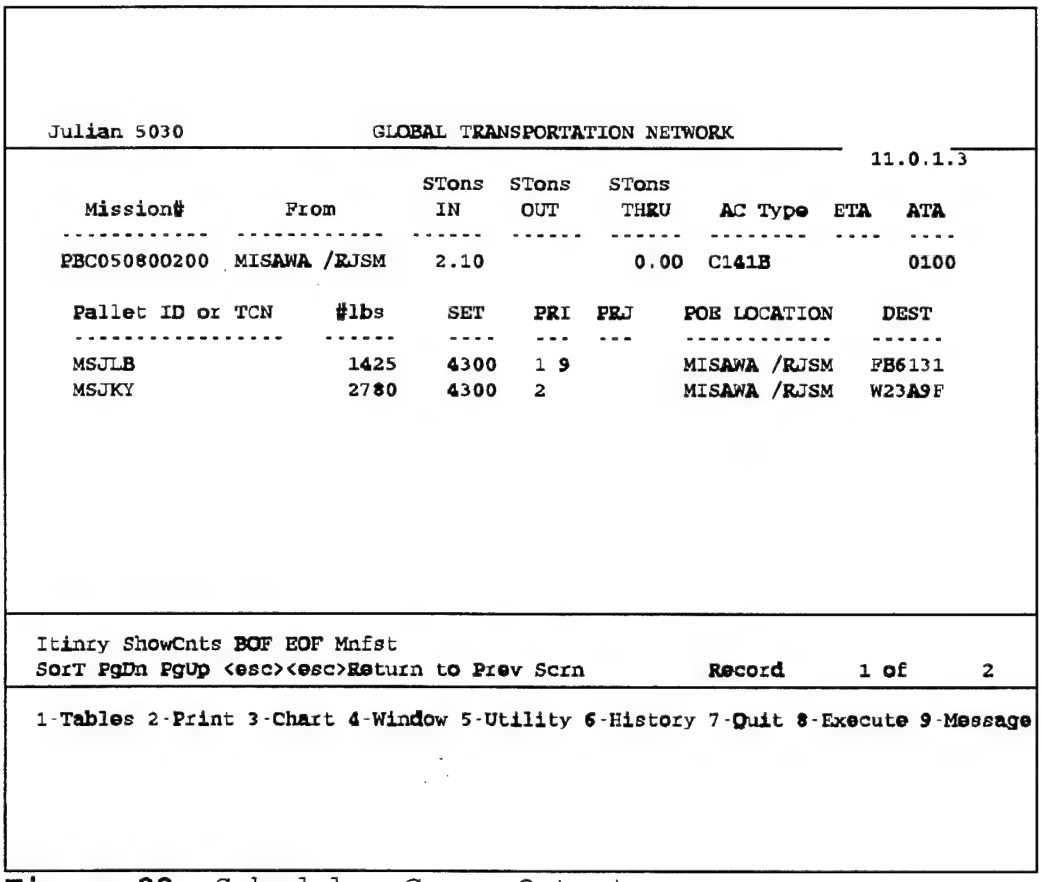
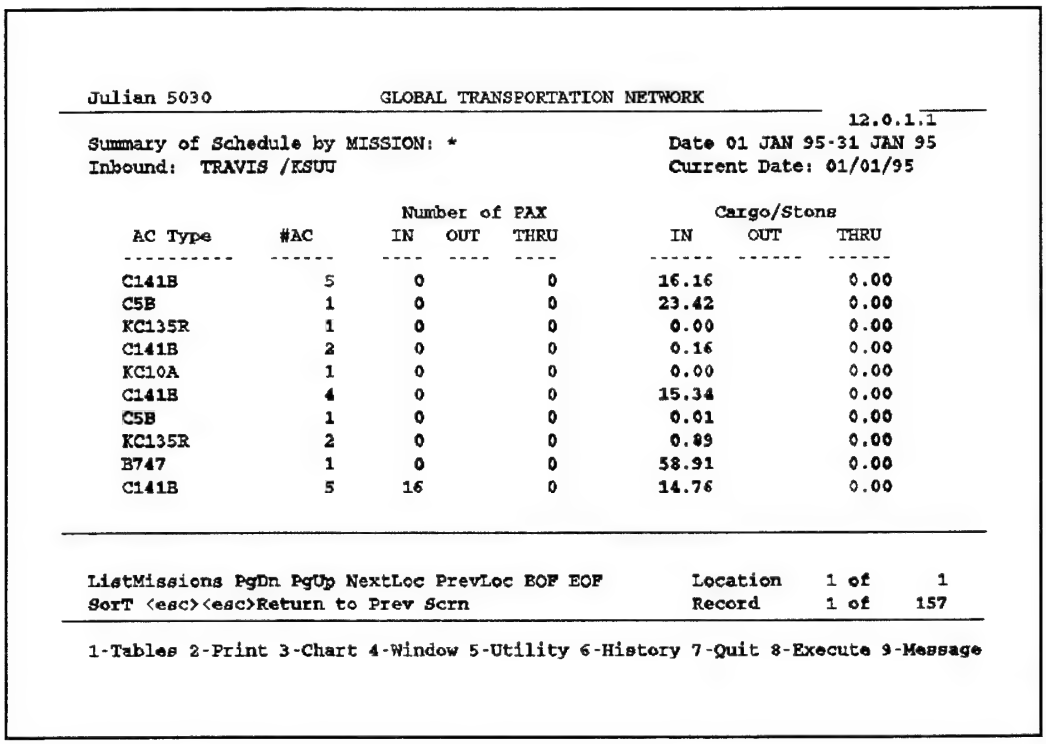


Figure 22 Schedules Cargo Output

Additionally, the user can select the Summary option from either the Output section of the Parameters screen or from the bottom choices of the List output screen.

Choosing Summary will provide the user with the information displayed in Figure 23. It provides the aircraft type, number of aircraft, and a summary of passengers and cargo for each day by aircraft type.

The Schedules query is particularly useful because its Air Mode Summary output displays both passengers and cargo. This capability can eliminate the need to do an additional query if the user requires both air passenger and cargo information for a specific area or mission.



Julian 5030 GLOBAL TRANSPORTATION NETWORK 12.0.1.1

Summary of Schedule by MISSION: * Date 01 JAN 95-31 JAN 95
Inbound: TRAVIS /KSUU Current Date: 01/01/95

AC Type	#AC	Number of PAX IN	OUT	THRU	Cargo/Stons IN	OUT	THRU
C141B	5	0		0	16.16		0.00
C5B	1	0		0	23.42		0.00
KC135R	1	0		0	0.00		0.00
C141B	2	0		0	0.16		0.00
KC10A	1	0		0	0.00		0.00
C141B	4	0		0	15.34		0.00
C5B	1	0		0	0.01		0.00
KC135R	2	0		0	0.89		0.00
B747	1	0		0	58.91		0.00
C141B	5	16		0	14.76		0.00

ListMissions PgDn PgUp NextLoc PrevLoc EOF EOF Location 1 of 1
SorT <esc><esc>Return to Prev Scrn Record 1 of 157

1-Tables 2-Print 3-Chart 4-Window 5-Utility 6-History 7-Quit 8-Execute 9-Message

Figure 23 Schedules Summary Output

E. SUMMARY

The Passenger, Cargo, and Schedules illustrations were a limited demonstration of the capabilities of the GTN Prototype. While the output examples were representative of the range and depth of information available from the Prototype's database, the ability to do queries is much more versatile than illustrated. The Prototype offers the user many query parameter choices with the ability to view as broad an output as all surface cargo for six different geographic areas to as narrow as a single piece of cargo or individual passenger.

While many of the command and control (C2) applications for the GTN are not available in the Prototype, the intransit visibility (ITV) of passengers and cargo moving

through the Defense Transportation System (DTS) is fairly comprehensive and well developed. The same seven source systems providing the ITV capability in the Prototype are all planned to provide data to the full version of the GTN, giving the user an idea of what to expect when the GTN reaches initial operating capability in the fourth quarter of 1996. In the interim, the Prototype offers customers of the DTS visibility over their cargo and passengers at a previously unknown level of accessibility and detail.

V. ANALYSIS

A. INTRODUCTION

The purpose of this thesis is to analyze the ITV capability of the GTN to determine whether it has the potential to effect a strategic change in the way military logistics managers conduct their day-to-day business.

The focus of this analysis is on the ITV capability of the GTN and whether the system provides quality information and the capability for DoD managers to use this information in achieving logistics cost savings.

B. METHODOLOGY

This thesis recognizes that the fully developed GTN with all the capabilities envisioned by USTRANSCOM is not expected to reach even initial operating capability until the fourth quarter of 1996. However, the current Prototype does incorporate seven of the key source systems planned for the full version of the GTN thereby providing a core ITV capability suitable for analysis.

To perform the analysis a GTN USERID and password were obtained for system access. A GTN USERS MANUAL sent to all who are approved GTN access and a GTN USERS' COURSE manual from the four-day course taught at USTRANSCOM were obtained. Both manuals were thoroughly examined and all their online exercises and different query options were performed on the GTN over a dedicated two week period.

The connection to the GTN for conducting online exercises was established in three ways:

- A personal computer (PC) from the Naval Postgraduate School's (NPS) computer lab connected directly to the NPS main computer. The NPS main computer through its Internet connection can access the Milnet and ultimately the GTN.

- A remote PC connection via a 9600 baud modem to the NPS main computer and its ultimate connection to the Milnet and the GTN.
- A remote PC connection via a 9600 baud modem to the GTN through commercial phone lines.

Additionally, approximately ten current GTN users were contacted and questioned about their experience with the system. While not valid as a statistically representative sample for drawing conclusions on the system as a whole, the user contact did provide the author with some additional insight on how the GTN is being used in day-to-day logistics operations.

C. INFORMATION QUALITY

1. Introduction

Information quality relates to the value of the information available from the system to the user. Such factors as comprehensiveness, detail, and format are all critical in determining the utility of the information and its ultimate benefit to the user.

The information available through the GTN is only as good as the information entered on its seven different source systems. Consequently, the quality of information is uneven with some source systems providing very detailed and comprehensive data and others less so.

2. Passenger Information

For passenger queries the quality of GTN AMC flight information is quite good. The level of detail is excellent, providing complete aircraft schedules, passenger manifests and itineraries. GTN users can easily locate and trace inbound/outbound passengers as well as view complete aircraft manifests.

The GTN passenger information could be more useful by providing UIC/ULN data which the source system, PRAMS, does

not record. Without UIC/ULN information, users of the GTN are unable to conduct wildcard queries for all passengers inbound to or outbound from their units. The user must query by name each known passenger to find their itinerary. While this is possible it could become very time consuming for the user, particularly in a large unit. It would be much more efficient for users to be able to query passengers using the UIC/ULN function of the GTN.

Although the AMC passenger information on the GTN is generally quite good, it is important to note that it is not a comprehensive view of DoD passengers. AMC flights mainly carry passengers to overseas destinations and on unit deployments, in CONUS and overseas, through Special Assignment Airlift Mission (SAAM) flights. The majority of DoD passengers routinely travelling between destinations within the continental U.S. (CONUS) fly on commercial flights and consequently the information is not available to GTN users.

In addition to not providing commercial airline information on DoD passengers, the GTN does not provide data on passengers travelling on Navy Air Logistics Office (NALO) flights. While the percentage of DoD passengers travelling on these flights is small and limited to members of the Navy and Marine Corps it is important to note NALO as another gap in GTN passenger ITV.

3. Cargo Information

Cargo information, in contrast to passenger, is supplied to the GTN from more than one source system. The quality of cargo information is consequently more varied than passenger and depends on the source system providing the information to the GTN.

The quality of air cargo information on AMC flights is very good. The GTN provides detailed information on itinerary, current location, and even contents when

available. GTN users requiring information on AMC manifested air cargo are provided all the data necessary to locate, identify, and trace their cargo through the system.

However, similar to air passengers, air cargo information only covers AMC flights. A significant amount of day-to-day military air cargo, particularly in CONUS, travels via contracted commercial air services and therefore this information is not available through the GTN.

The quality of DoD surface cargo manifested through a military transportation source system is also quite good. Ship schedules, manifests, container identification, and contents are all generally available and complete.

Although similar to the air mode, the GTN surface information provides ITV mainly over cargo destined to or from overseas and deployed units. The GTN surface cargo information is mainly supplied by source systems that provide data on cargo moving by ship. Very little cargo moves between CONUS locations by ship, thereby limiting the value of GTN surface information for CONUS activities.

The GTN does provide some information on DoD requisitioned cargo moving within CONUS by contracted commercial air and truck. However, this requisition information is provided by the logistics source system DAAS and is generally poor. Virtually all the information needed to track and locate the requisition, such as port of embarkation, location, and destination is either displayed as unknown or blank in the GTN. Furthermore, the information that is being provided by DAAS to the GTN is already available to the requisitioning activity through the distribution of DAAS status. DAAS status is usually sent by the servicing supply depot to the requisitioning command through Autodin message or mail. DAAS only provides the GTN user with the knowledge that their cargo is in the transportation pipeline; more detailed or comprehensive

information is not available.

In summary, the quality of GTN cargo information is similar to that of passengers. It is very good for overseas and deployed units, but provides very limited visibility for most CONUS activities. Unfortunately, the majority of the day-to-day cargo sustaining CONUS DoD activities is not entered into any of the GTN transportation source systems. This cargo mainly travels by contracted commercial air or truck service from DoD supply depots and detailed information is not available to GTN users.

D. MANAGERIAL USE

1. Introduction

The central issues of managerial use of an information system to effect strategic change revolve around the accessibility of the system, where it can be used most effectively, and enlightening users to the potential of the system.

Accessibility refers to the level of ease or difficulty of users in connecting, logging on, and successfully extracting the required information from the system. Deciding where the system can be used most effectively implies a need to analyze and determine what activities can gain the most benefit from the system. Finally, enlightening users to the potential of the system refers to the need to demonstrate how the information can benefit the user.

2. Accessibility of the GTN

Accessibility is a critical determinant of whether the user is actually able to access the system and obtain the information they require. If the system is so cumbersome or complicated as to inhibit the user from accessing and using it then it is of little value to the organization because it fails to provide its intended benefit.

Accessibility of the GTN begins with obtaining the USERID and password for logon to the system. It requires a one-page letter or fax on Command letterhead with some basic information on the user, such as name, rank, and SSN, as well as the intended use of the system to USTRANSCOM GTN PMO. The USERID, password and GTN USERS MANUAL were received approximately two weeks after the request was mailed. It was a simple, uncomplicated task that received a quick response from USTRANSCOM.

Connection to the system is available in the four ways defined in Chapter IV and was established for this analysis as discussed in the Methodology section of this chapter. The GTN connection is important since it can affect the speed of communication between the user's PC or terminal and the GTN.

For example, when connected directly to the NPS main computer from one of the NPS computer lab PCs communications time was frustratingly slow. Waiting a minute or more for the execution of a keystroke command was common. During one sixty minute period on the GTN over twelve minutes was recorded as waiting for the execution of simple keystroke commands. It is important to note that this was not time waiting for the system to search its database in response to a query, but less demanding actions such as making program menu choices or entering date ranges. Conversely, using a remote connection to the GTN with a PC via a 9600 baud modem through the commercial phone number was extremely fast. There was almost no perceptible delay between the entering of a command and execution.

While the connection and subsequent communication to the GTN is not an analysis of the system itself but of the users capability, it is important because the speed of response affects the usability of the system. If communications are as slow as discussed in the first

connection users may be discouraged from using the GTN.

The GTN does offer users a very good response time. Therefore it is important that users having a choice of connections explore the different GTN options to find their most effective connection.

The GTN USERS MANUAL, which for many users will be the only reference available, is a daunting endeavor at over 280 pages, excluding appendices. While all information to navigate through the GTN and accurately construct queries can be gleaned from the manual, it does require a degree of commitment and perseverance that may only be possessed by the most determined of potential users. A frequent comment made by several failed GTN users, those who had obtained a USERID and password but had not used the system, was that they did not receive any training nor did they have the time to read their GTN USERS MANUAL.

Actual navigation through the GTN is fairly intuitive and, with a little previous experience and knowledge of computer programs, most users should be able to navigate through the system fairly easily. The computer keyboard arrow keys can be used to move between menu selections, or alternatively, each menu choice, such as Air or Surface in the Mode field of the GTN Main Menu, has one letter bolded which can be entered on the keyboard to make the selection.

The GTN Prototype does contain many features designed to make the system more user friendly for DTS customers. For example, the Message line at the bottom of each screen displaying an explanation and/or instruction on the menu item currently selected effectively guides the user through the query and output screens.

Another convenient user friendly function of the GTN is the online reference available in the Tables function of the Command line. It provides the user with the capability to look up all the military and transportation codes needed to

enter data and interpret output from the GTN. It makes the GTN much more usable for those outside the DoD transportation community who are unfamiliar with these codes.

The use of the wildcard "*" for framing queries is also extremely beneficial to the user. Knowing how to use it negates the need for the user to have onhand a specific mission number or entire TCN to conduct their query. Furthermore, its use provides the capability to do entire Prototype database searches to find all material or schedules for a unit or area.

USTRANSCOM is dedicated to offering complete customer service and support to GTN users. If assistance is needed the commercial and DSN technical and customer service phone numbers are prominently printed in the beginning of both the GTN USERS MANUAL and GTN USERS' COURSE. The service phone numbers are also one of the first pieces of information to greet the user when they log on to the system in the GTN Master Menu.

Additionally, the GTN provides the capability to send online comment and technical reports through the systems Mail function on the Command line. While conducting GTN exercises assistance was sought through an online comment report with a thorough, helpful response received from USTRANSCOM the same day.

In summary, the GTN is a fairly intuitive system that approaches the usability of many commercial retail software programs. There are many obvious and successful efforts made at making the system accessible to those beyond the transportation community and assistance is readily available. The transportation information available through queries in the GTN Prototype database should be accessible to most users after studying the GTN USERS MANUAL and a little practice online. The only significant drawback is

the somewhat ponderous GTN USERS MANUAL. Unfortunately, the sheer volume of the UM does not adequately represent the relative simplicity of the actual GTN for those seeking to do nothing more than a simple query.

3. Effective Use of the GTN

Prior to the implementation of the GTN, only transportation or logistics activities with access to a transportation information source system had any ITV over the DTS. Customers of the DTS were dependent on these organizations for tracing information on their passengers and cargo.

By establishing the GTN as a system that does not require any specialized software or hardware, simply a PC and modem, USTRANSCOM has effectively made ITV available to all of its customers. Essentially, USTRANSCOM through the GTN has removed a layer of organization between the transporter and the customer seeking transportation data. The availability of transportation information to DTS customers formerly dependent on other organizations for their shipment data represents the greatest potential for change and logistics cost savings with the GTN.

For example, a military aerial port that has both PRAMS and ADAM III for manifesting air passengers and cargo, and therefore system visibility over air passengers and cargo, gains only marginal benefits from having access to the GTN's ITV capability. Conversely, the customer who frequently contacts the aerial port for tracking information on their incoming shipments could greatly benefit from access to the GTN's ITV capability. Not only would the customer acquire the information they seek earlier and without having to contact the aerial port, thus providing a greater opportunity for better decisions, but the aerial port staff would be spared the task of having to trace and respond to the customer's request. Consequently, productivity for both

the customer and the aerial port could be improved.

One GTN user from the Defense Distribution Depot in Norfolk, Virginia who does not have access to any of the GTN source systems stated that each successful trace on the GTN saved him up to twenty phone calls and hours of work time.

In summary, the GTN can be employed most effectively by providing its ITV capability to DTS customers who are currently dependent on transportation or logistics organizations to provide them information on their passengers and cargo.

4. Enlightening Users

In addition to getting GTN access to the managers who can benefit the most from it, these same managers must know how to use information available from the system to their benefit.

Frequently when a military computer systems is developed and implemented the emphasis in training is on the transaction processing and data entering function. The system operator is trained in the mechanics of how to use the system, and if there is any training for supervisors or managers it is usually similar to the system operator's. For the manager, often the only clear benefit to the new system may be that it speeds up transaction processing and produces better records.

What is frequently lacking in the installation of a new computer system is managerial training on how the information from the system can be used to change and improve the organization. This often-ignored managerial training could be the most important part of the implementation and where the most valuable benefits from any new system could be realized.

USTRANSCOM appears to have taken managerial training into account in their development of the GTN. Both the GTN USERS MANUAL and the GTN USERS' COURSE contain Query Option

Scenarios designed to demonstrate GTN applications to real world problems. These scenarios demonstrate how managers in the DoD can use the information on the GTN to make better decisions and can lead to greater efficiencies and cost savings in logistics.

The Query Option Scenarios are applicable to a wide variety of GTN applications covering all the Services and applying to managers both in and out of the logistics field. For example, the Surface Schedules Scenario details how a Navy Supply Liaison Officer to the commercial port of Apra Harbor, Guam can use the GTN to answer the question "How much of what kind of cargo is arriving and when?" In addition to detailing the mechanics of performing the appropriate query, the scenario suggests that the GTN information can be used to notify customers in advance of their cargo's arrival date, plan for appropriate transportation to distribute the cargo, and check the GTN on a weekly basis to plan ahead for arriving ships and cargo. (GTN USERS MANUAL, 29 August 1994, pp. B-19 - B-22)

E. SUMMARY

The analysis of this thesis was to determine if the ITV capability of the GTN provided the quality information necessary and the opportunity for managers to take advantage of it to effect strategic change through cost savings in day-to-day DoD logistics.

The quality of information was determined to vary not only with the input to the GTN from the source system, but also with the origin and destination of passengers and cargo. The quality of GTN information for passengers and cargo originating or destined to overseas or deployed units is very good, being both comprehensive and detailed. However, because most cargo and passengers travelling between destinations within the continental United States

(CONUS) are shipped via commercial airlines or contracted commercial carriers, the use of the GTN to users seeking information on within-CONUS shipments is limited.

For managers it was determined that the GTN is an easily accessible system whose only impediment to usability is an overly voluminous manual for the average user needing to trace passengers or cargo.

The potential for the most effective use of the GTN was determined to be in providing the system to managers who are customers of the DTS but who do not have access to any of the current source systems. Enlightening those managers on the uses of the GTN was also deemed critical to effecting logistics improvements, and it was determined that USTRANSCOM is making an effort to do so through the inclusion of Query Option Scenarios in the GTN USERS MANUAL and GTN USERS' COURSE manual.

VI. CONCLUSIONS AND RECOMMENDATIONS

The GTN represents a tremendous improvement in providing transportation information to customers of the DTS. It is exceptional in that through its uncomplicated connection and user-friendly interface the GTN is accessible to virtually anyone needing DoD transportation information.

Furthermore, by integrating information from each of the TCCs and offering user access to members or each Service, the GTN truly embodies the philosophy of a Joint information system. The GTN may well be one of USTRANSCOM's most successful efforts to date at integrating the DTS and representing themselves to their customers (many of which still believe the individual Services own the TCCs) as the single manager of Defense transportation.

The research question for this thesis was whether the ITV capability of the GTN has the potential to effect strategic change through cost savings in the day-to-day logistics business of the DoD. The conclusions are that for many activities the GTN does contain quality information, and managers are provided the capability to take advantage of this information for making better decisions leading to lower logistics costs and improved readiness.

However, this is qualified by the determination that the quality of information varies, and the most significant advantages are to those managers requiring information on overseas or deployed unit passengers and cargo. These managers are the ones who can primarily benefit from the information currently available from the GTN Prototype.

The biggest gap in intransit visibility is in shipments from CONUS supply depots to CONUS units. These shipments, unless destined for overseas locations, generally travel by contracted commercial air or truck and are never manifested through any of the transportation source systems. Unfortunately, this same cargo represents the majority of

day-to-day logistics business for DoD activities within CONUS.

Consequently, managers requiring information on within-CONUS passengers and shipments will derive only limited benefits from the information currently available from the GTN Prototype. This by no means suggests there is no value to these managers from access to the GTN. The monetary investment and cost for most activities should be minimal, if any, as virtually every DoD organization has access to a PC and modem. And while there may only be limited ITV for their cargo and passengers, limited transportation information is still better than none at all. Furthermore, an activity currently needing only information on in CONUS transportation may find that the next U.S. military involvement in an international crisis or conflict will require the need for them to access the GTN's more comprehensive overseas information.

USTRANSCOM recognizes the need for visibility over contracted commercial shipments and the envisioned version of the GTN is expected to incorporate some commercial source systems. However, the objective for commercial source system visibility was not well defined in the GTN literature examined for this thesis, and it was unclear what the scope or comprehensiveness of the commercial source systems providing intransit visibility would be.

It is encouraging however to note DLA's recent decision, as mentioned in Chapter II, to contract with only one or two commercial air carriers for the purpose of providing ITV over their commercial air shipments.

Certainly there are many cost-saving logistics improvements possible with the information currently available from the GTN. One of the possible logistics benefits from the GTN is a reduction in the cost of failure, specifically, reducing the cost of unnecessary additional

movements of misrouted passengers and cargo. The information available from the GTN allows the customer to view and thereby establish a greater degree of control over their passenger and cargo movements. This offers the DTS customer the opportunity to reroute cargo and passengers if originally misrouted or when a deployed unit has a schedule change.

Additionally, logistics savings could accrue from reducing the staffs that provide shipment tracing and tracking service. The Navy, for example, maintains a number of units whose primary purpose is to trace, and if necessary expedite, shipments for customers. If the customer acquires this capability through the GTN it is possible that cost savings could be achieved by reducing these staffs.

Similarly, many transportation and logistics activities spend significant amounts of time responding to customer tracing requests. If the customer gains access to the GTN thereby eliminating their tracing requests, these same transportation and logistics activities could potentially accrue cost savings by better utilizing or reducing their staff.

Additionally, Lt. Arthur Hughes in his 1994 NPS thesis concluded that the ITV capability of the GTN could lead to cost savings through a reduction in shipments reported as lost and a corresponding reduction in their associated reorders. (Hughes, Arthur D., March 1994)

Although this thesis recognizes that the GTN Prototype represents only a short term effort by USTRANSCOM to provide their customers with an initial ITV capability while the envisioned version of the GTN is being developed, the implementation of the envisioned version is still over a year away. Consequently it may be worthwhile to make some improvements to the GTN Prototype and therefore some recommendations are provided. Additionally, these

recommendations may be useful to the GTN Program Management Office at USTRANSCOM as considerations for the envisioned version of the GTN.

To improve the GTN this thesis recommends that efforts be made to record UIC/ULN passenger data in the PRAMS source system. This would make the information available to GTN users who could then use the wildcard query of the system to answer such questions as "who is currently booked inbound to my unit and when will they arrive?" Presently, the only way to answer such a question using the GTN is to individually query the system on each known inbound passenger.

Furthermore, the users of the GTN could benefit from an improved users manual, specifically, a more condensed and focused version of the current GTN USERS MANUAL. Once the basic steps of how to perform a query are adequately explained, they can easily be applied by the user to the different options available for Passengers, Cargo, and Schedules without repeating an indepth explanation of each option as does the current GTN USERS MANUAL. This would greatly condense the current GTN USERS MANUAL and allow users to more quickly become proficient on the system.

Additionally, this thesis recommends that efforts to promote and provide access to the GTN be focused on DTS customers outside the DoD transportation and logistics community who do not have access to any of the GTN source systems. With the simple access to the GTN, virtually all DTS customers can conduct their own tracing queries. As stated previously, this is where the greatest logistics benefits from the ITV capability of the GTN can be achieved. Not only will this achieve efficiencies for both the customer and the transportation and logistics organization, but will also achieve USTRANSCOM's GTN goal of reducing overordering DoD wide. The customer will only stop overordering when it becomes easier and quicker to trace and

locate their shipment than to reorder. This becomes possible when the customer gains access to the GTN.

Integrated ITV over the DTS provided by the GTN represents a new and fascinating capability for USTRANSCOM's customers. This thesis has explored the possibilities available from only the limited GTN Prototype currently in use. The complete version will significantly enhance the ITV capabilities presently available in the Prototype by incorporating more DoD source systems and integrating some commercial transportation systems. This enhanced ITV capability should greatly increase the value and benefit of the GTN to DTS customers requiring transportation information on passengers and cargo travelling within CONUS.

Consequently, this thesis recommends that further research be conducted on the full version of the GTN when it reaches initial operating capability to more specifically analyze the logistics cost benefits and strategic changes possible from its enhanced ITV capability.

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